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COMPUTERWORLD

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Mainframe users express confusion over expanded, solid-state storage options. Page 55.

Prime powers up to 3090 range

BY JAMES CONNOLLY
CW STAFF

NATICK, Mass. — Prime Computer, Inc. leapfrogged archrival Digital Equipment Corp. last week with a pair of superminicomputers featuring performances that Prime claims surpass those of DEC systems and pit Prime machines against IBM mainframes.

Prime said it hopes to use the 6350 uniprocessor and 6550 dual processor to provide a growth path for its user base, which is heavily oriented toward CPU-intensive applications such as computer-aided design, and to attract new general-business customers of the type often served by mainframes.

"We are not positioning these as mainframe systems, and we certainly don't expect to go after the entire IBM market," said Dick Snyder, vice-president of software development at Prime. Snyder was quick to add that the 6350, rated at 11.8 million instructions per second, and the 6550, rated at 23.6 MIPS, drive Prime's product line past the performance of the IBM 4381 and into the range of the IBM 3090 Models 150E and 180E.

Prime's performance claims also surpass those of DEC for its high-end uniprocessor, the 6-MIPS VAX 8700, and its 12-MIPS VAX 8800 dual processor. Prime claimed the 6550's architecture is more efficient than other minicomputer multi-

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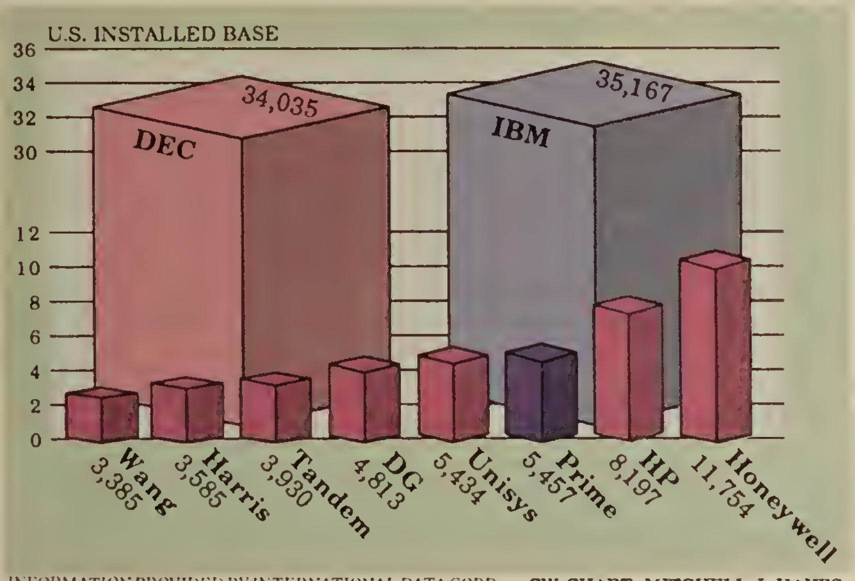
A long way to climb

Prime and a host of other vendors compete in mid-range market dominated by IBM and DEC



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP. CW CHART: MITCHELL J. HAYES

Multiuser support in OS/2 plan

BY DOUGLAS BARNEY
CW STAFF

MONTVALE, N.J. — IBM plans to evolve its microcomputer Operating System/2 to include multiuser capabilities, IBM officials said last week.

"It is our intent to support multiuser capabilities eventually on OS/2," said William Lowe, president of IBM's Entry Systems Division. Officials from both IBM and Microsoft Corp. confirmed that IBM is moving toward providing multiuser features for the operating system. However, they declined to give a time frame for those developments.

This strategy will unfold over an extended period of time. The basic OS/2 multitasking operating system, which can address up to 16M bytes of random-access memory, will itself not be available until the first quarter of 1988.

Although Microsoft, principal developer of PC-DOS and OS/2, once vehemently denied that DOS would evolve into a

Continued on page 6

Silver lining

IBM first-quarter profits were down, but company spirits are rising. DEC continues to soar. Page 125.

Apollo welcomes others to Domain

Environment made network independent, adapted for IEEE Ethernet

BY ELISABETH HORWITT
CW STAFF

CHELMSFORD, Mass. — Responding to user demand for lower cost and standardized networking, Apollo Computer, Inc. announced last week that it has ported its Domain computing environment onto the IEEE 802.3 Ethernet local-area network, with support for other standard networking environments upcoming.

Apollo has made Domain "network independent" by isolating higher level software functions, such as file access and data transport, from the two lower levels that define Apollo's proprietary 12M bit/sec. token-ring LAN, explained Michael A. Gallup, Apollo's director of product marketing and programs.

As a result, the Domain networking system, which provides transparent distributed file access across the network, can be ported to a variety of networking standards, Gallup said. "We started with Ethernet because it is the most widely installed, but we can move to the 802.4 token bus or 802.5 token-ring as demand justifies," he explained.

In November 1986, Apollo announced an Ethernet Gateway that allows Domain workstations on its proprietary token ring to communicate through one workstation with other ven-

Continued on page 125

ETA goes to school, preps for entrance

BY JAMES CONNOLLY
CW STAFF

TALLAHASSEE, Fla. — Software problems will keep the first field-test model of ETA Systems, Inc.'s ETA-10 supercomputer from being ready for customer acceptance as scheduled for June. But those problems will not prevent the user of that model from completing a supercomputing center built around the ETA-10, which is set to be introduced next week.

The first CPU in what eventually will be a four-CPU complex was delivered to Florida State University in January, and the second processor was wheeled in during the latter part of March.

The ETA-10 is the first major product to be announced by the 4-year-old Control Data Corp. spin-off.

When configured with the maximum eight CPUs, the ETA-10 reportedly will soar past the performance levels of Cray Research, Inc.'s Cray-2. An eight-CPU ETA-10 was designed to perform about 8 billion floating-point operations per second, compared with 2 GFLOPS for the Cray-2.

Each processor cabinet includes memory, cabling, controllers and a liquid nitrogen coolant tank that chills circuits to 320 degrees below zero Fahrenheit. Each Florida State CPU has 4 million words of memory. The university also will use ETA Systems' shared memory unit, which eventually will allow the four CPUs to ac-

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NEWSPAPER

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And now, the good news. Wang surpasses its break-even target, posts its first quarterly profit of the fiscal year and rolls out an integrated image processing system that combines image processing with DP, office automation and communications capabilities. Pages 12, 103.

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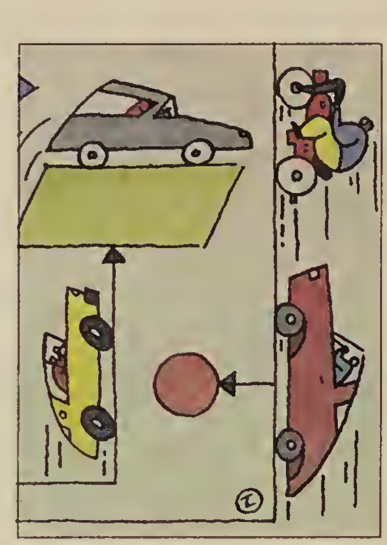

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55 DEC doubles memory of VAX 8600 and 8650 superminis.

Quotable

"The Macintosh office was an idea a little bit ahead of its time. It showed our naivete in terms of what it took to develop communications products."

CHARLES BERGER
VICE-PRESIDENT OF
BUSINESS DEVELOPMENT
APPLE COMPUTER, INC.

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NCR gives early peek at transaction system links

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — NCR Corp. last week provided users with an early look at interfaces that will link the firm's 8500 and Tower lines with its 9800 transaction processing system.

The interfaces should help the NCR 8500 and Tower become building blocks of an extended NCR 9800 system, the company said. The interfaces, demonstrated at the Nucon:87 NCR Users Conference here last week, will not be formally announced until later this year.

The two interfaces should be available before the end of the year, according to NCR managers who developed them.

A link between the NCR 8500 computer and the NCR 9800 is ready to go into beta testing, according to Gary C. Mathews, director of marketing support for NCR's engineering and manufacturing group in San Diego.

Mathews explained that the interface works by linking the buses of the two computers. "A system bus adapter allows us to connect some models of the 8500 to the bus of the 9800.

"When they're attached, the 8500 runs the VRX/E operating system, just like the 9800 does. As a result, the 8500 functions identically to any of the other attached processors in the 9800 complex," Mathews explained.

"It's hardware and firmware that does the interconnecting, and the user does not have to change the operating system or the applications in order to use the interface," said David J. Olivet, director of product management at NCR's San Diego development center.

The interface that links Tower minicomputers to the NCR 9800 will not require the attached Tower to run VRX/E — something that all other 9800 attached processors must do. Instead, the Tower will continue to run its Unix operating system. "As far as the Tower's concerned, system memory becomes just another file device or I/O driver," said Keith Vozel, a software specialist who presented a Nucon:87 seminar on NCR 9800 file structures.

Variations of the 8500 interface that are currently being developed should allow users of the NCR 8600 and NCR 8800 systems to link their computers to the NCR 9800. But those interfaces may not appear for more than a year, Mathews said. Still, users are paying close attention.

"The ability to use the NCR 8800 as a backup system to the NCR 9800 interests me," said Larry Hocking, director of data processing at Euclid General Hospital in Euclid, Ohio. Hocking, who has an NCR 8565 and an NCR 9050 in his computer room, said he is considering the addition of an NCR 9800 as a primary system at the hospital.

TOP reaches new peak

Expanded system supports X.25 and token bus

BY ELISABETH HORWITT
CW STAFF

Version 3.0 of the Technical Office Protocol (TOP) networking standard was released last week by Boeing Computer Services Co. and incorporates support for the IEEE 802.4 token bus, 802.5 token ring and CCITT X.25 protocols as well as additional networking functionality, a Boeing spokesman told *Computerworld.*

Like the existing TOP 2.0, the new version supports the IEEE 802.3 Ethernet protocol as the primary media-access method for the office networking standard. However, Version 3.0 also supports the IEEE 802.5 token ring and X.25 packet-switching protocols as "alternative media," the Boeing spokesman said.

The new version also supports the IEEE 802.4 token bus, part of the Manufacturing Automation Protocol (MAP) standard, as an alternative medium.

However, as the originator and chief developer of TOP, Boeing is sending a clear message to vendors and users that the token bus "is just for those companies that want to integrate TOP on their MAP networks," the spokesman said. "It is not among the major choices for TOP."

TOP Version 3.0 will incorporate protocols for additional networking functions, including remote terminal access, the CCITT X.400 electronic-messaging protocols, network management and directory services.

Another "major new area" included in the standard is interchange formats for office documents, computer graphics and product definitions, the Boeing representative observed.

TOP Version 3.0 was released by Boeing to the Society of Manufacturing Engineers, which will publish documentation of the specifications in June.

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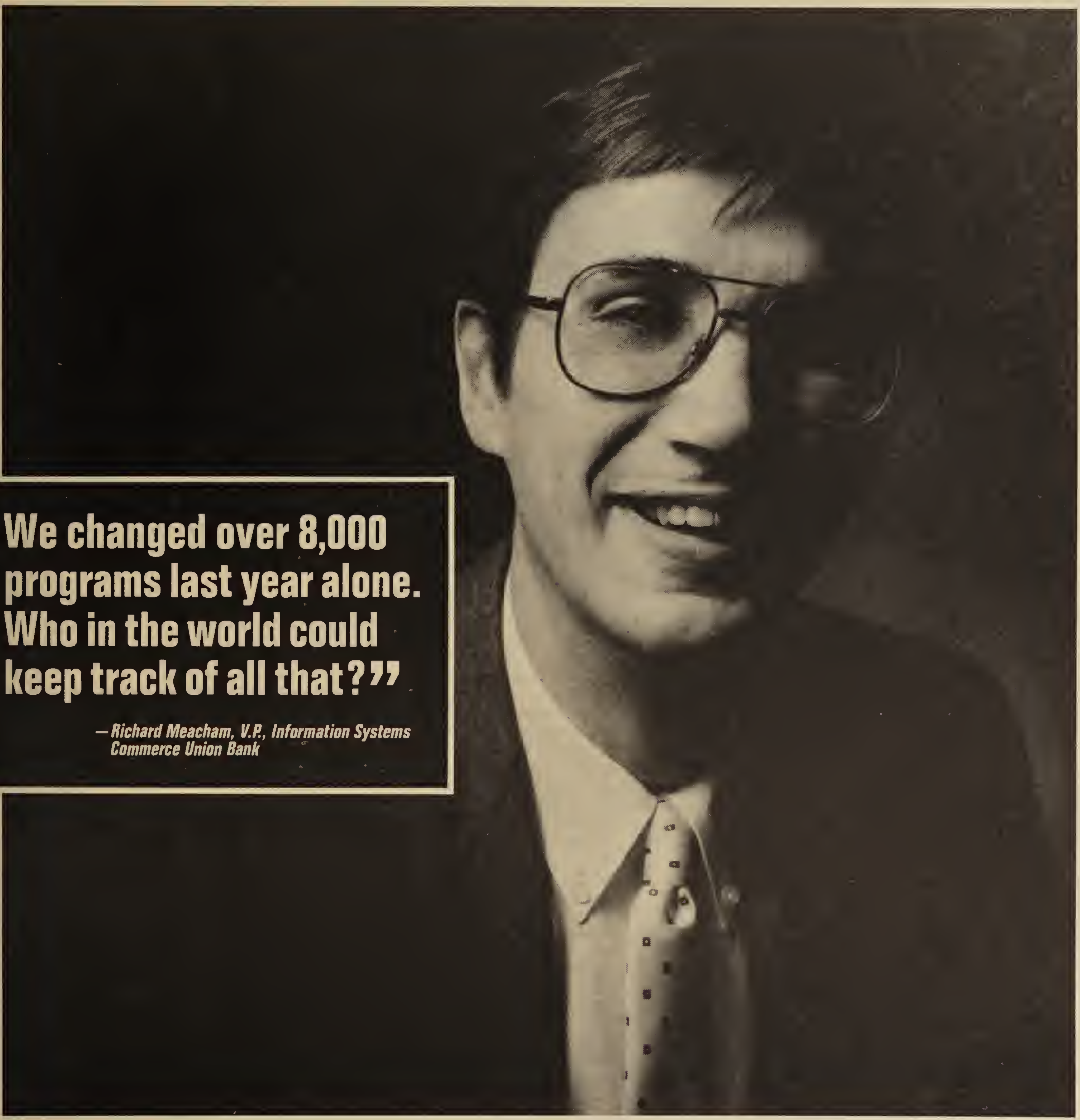

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—Richard Meacham, V.P., Information Systems
Commerce Union Bank

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Prime

FROM PAGE 1

processor technologies because Prime's CPUs share work load and memory equally, rather than using the more common master-slave relationship or the clustering approach characteristic of other vendors.

Prime reportedly has been working for two years to build up sales and support teams in anticipation of the 6350 and 6550, which were code-named Leopard and Panther, respectively.

Emulates IBM

Snyder said that under former IBM executive and current Prime President Joe M. Henson, Prime has emulated IBM in trying to sell products to the highest possible level of customer companies.

He said Prime also has developed a capacity planning tool to help sales personnel determine which configurations customers will need as they move into the larger systems.

Prime said the 6350 was designed to support 64M bytes of memory, and the 6550 reportedly will support 128M bytes of memory.

However, the memories will be limited to half of those capacities for several months as Prime enhances its Primos operating system. The 6350 is available now, and the 6550 is scheduled to be delivered in the fourth quarter.

Higher than expected

Analyst Richard Mikita of International Data Corp., a Framingham, Mass.-based market research firm, said Prime's performance numbers are higher than he expected, particularly for the 6550.

When asked whether Prime has sufficient third-party software support to expand its general-purpose computing base, Mikita said, "They don't have as strong a third-party portfolio as their competitors, but they can bring to the table something in all categories."

Mikita observed that Prime customers can feel assured by Prime's ability to balance its internal and external product development efforts.

He said Prime has enhanced its 50 Series superminicomputers, which includes the new systems, while working with other vendors to develop products such as workstations and a near-supercomputer.

Mikita said Prime's share of the superminicomputer market has remained stable in recent years, averaging about 3% of worldwide shipments.

Praise power

Two Prime customers praised the expected power of the 6350. David DeParle, marketing manager of Premier Systems, Inc. in Philadelphia, said his company has been running a 6350 for two weeks and that Premier's Trust Plus trust banking package runs fast enough to "give us a shot at the upper end of the market that previously only mainframes could penetrate." Premier acts as a value-added reseller for Prime.

Meanwhile, Cathy Van Orman, associate director of administrative information systems at the University of Southern California in Los Angeles, said she expected to receive a 6350 last week.

Van Orman added that the system will run the school's standard benchmark and payroll and monthly financial packages during a test phase.

Those payroll and monthly financial systems have been running on overloaded processors that are among the seven Prime 9955 II CPUs in the university's computing center.

Like the year-old 9955 II, the new systems use a five-stage pipeline that handles instructions in assembly line fashion, allowing the pipeline to process up to five instructions at a time. The processors are based on semicustom Motorola, Inc. MCA2500ECL technology, which packs 2,500 gates on each chip.

The dual processors in the 6550 were designed to handle large work loads by having each processor take tasks from a ready list as it completes an earlier job.

Balances activity

"The 6550 is a true dual processor that balances the activity of the two CPUs," said Stephen C. Kiely, Prime vice-president of systems marketing and development.

"Both of them can do input/output to get the highest efficiency possible in the way the computer uses its resources. Mainframes do this, too, but no other commercially available, general-purpose superminicomputer does," he added.

The new systems reportedly support up to 64 disk drives, each with 770M bytes of storage, and up to 960 users.

Prices for the 6350 are said to range from $549,000 to $665,700. The price of the 6550 ranges from $804,000 to $920,700.

General-purpose market

Prime is focusing on four general-purpose markets in addition to the technical computing customer base that Snyder said was running out of raw CPU power with the previous high-end, 5-MIPS Prime 9955 II.

Snyder claimed the 6350 and 6550 are suited for the financial services market, which needs high-performance systems in addition to their general-purpose mainframes for applications such as modeling.

Snyder also listed manufacturing as a growth market for the new Prime systems, particularly as controllers for diverse shop-floor systems.

He said Prime hopes to build on its general-purpose computing user base in the government and education sectors, in which some customers have wanted more powerful systems than Prime previously offered.

Prime choice

Prime's 6350 and 6550 models offer greater performance over existing 9955

	MIPS[1]	*Cycle Time*	*Maximum Memory (bytes)*	*Maximum Disk Storage (bytes)*	*Typical Price*[2] *(memory)*
Prime 6350	11.8	34 nsec	64M	50G	$619,400 (32M bytes)
Prime 6550	23.6	34 nsec	128M	50G	$920,700 (32M bytes)
Prime 9955 II	5	46 nsec	32M	10G	$322,355 (16M bytes)

[1] Millions of instructions per second.

[2] Includes CPU, operating system, disk storage, tape drive and console.

CW CHART

IBM heats up superconductor race

New advance uses Josephson junction devices and liquid nitrogen

BY JAMES CONNOLLY
CW STAFF

YORKTOWN HEIGHTS, N.Y. — IBM claimed an advance in the superconducting field last week with the announcement of a thin-film superconducting device based on copper-oxide materials.

The technology, developed in IBM's Yorktown Heights and Zurich research centers, is based on the use of two thin-film Josephson junction devices one one-hundredth the thickness of a human hair. The development came despite IBM's statement three years ago that it was abandoning most of its Josephson junction-related work.

The Josephson junction-based devices, called Superconducting Quantum Interference Devices (SQUID), were designed to operate at temperatures that make superconducting practical. The SQUIDs are chilled using liquid nitrogen, unlike some other Josephson junction-based devices that are cooled with liquid helium.

IBM claimed its devices operate at 68 degrees Kelvin, or 337 degrees below zero Fahrenheit, compared with 4 degrees Kelvin with liquid helium cooling.

A superconductor is a material that loses all resistance to electricity below a specific temperature. IBM said its devices actually become fully superconductive at temperatures as high as 87 degrees Kelvin.

Superconductors are expected to be used in future computer systems and instruments as well as areas such as electric power transmission.

IBM claimed that liquid nitrogen's second advantage over liquid helium is its lower cost. IBM said its developments were built on 1986 breakthroughs by researchers J. Georg Bednorz and K. Alex Mueller of IBM's Zurich facility.

"In the past year, science has made enormous progress in raising superconducting temperatures. We are delighted that our researchers discovered this new class of superconductors, and we have high hopes that the materials will prove useful in a number of important areas," said Praveen Chaudhariok, IBM Research Division's vice-president of science.

CORRECTIONS

IBM salesmen did not sell all 19,000 units that came off IBM Credit Corp. lease in 1986, as was stated in "IBM Sales of Leased Hardware Take Off" [CW, April 6]. Computer Dealers and Lessors Association officials say that salesmen sold only part of 19,000 total units, but declined to say how many.

Irwin Magnetic Systems, Inc. shipped 12,000 tape drives of greater than 20M-byte capacity in 1986 and expects to ship 60,000 this year. Incorrect figures were reported in "Maintaining holds on niche storage markets" [CW, April 6].

The Annual Microcomputer Awards ballot [CW, April 13] incorrectly identified the supplier of Merge/386. The correct supplier of Merge/386 is Locus Computing Corp.

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Few PC makers worried by IBM price cuts

BY ALAN ALPER
CW STAFF

NEW YORK — The price reductions that IBM announced on its existing line of Personal Computers early this month were not aggressive enough to force most major PC-compatible makers to immediately alter their price structures, analysts and some competitors said last week. However, in the long term, the IBM moves will exert pricing pressure, they predicted.

The price cuts, which ranged from 7% to 17% on the PC Convertible and on models of the PC XT, AT and 3270 Personal Computer, will have a ripple effect on the market, noted Tom Roberts, an analyst at International Data Corp., a market research firm in Framingham, Mass. "I expect that it will drive [compatible vendors'] prices lower in the long run," Roberts said.

But Tim Williams, director of micro/PC information services at Future Computing/Datapro, a Dallas-based market research firm, said IBM's price cuts and new products do little to create immediate pricing pressure on IBM PC-compatible vendors.

"It ultimately depends on what IBM does over the next 12 months with their existing product line," he said. "If they withdraw the products, it will create pressure." Yet if firms like Compaq Computer Corp. and Tandy Corp. continue to evolve current hardware and Microsoft Corp. MS-DOS standards to new levels of performance, pricing pressure may not be as severe as imagined, Williams suggested.

So far, none of the leading PC-compatible vendors contacted last week have cut their price tags in the aftermath of IBM's product unveiling.

Competitors Hewlett-Packard Co. and Epson America, Inc. slashed PC-compatible prices days before IBM's April 2 announcement. HP cut prices by 15% on its Vectra PC Models 50 and 60, citing lower material and manufacturing costs. Epson cut tags on its Equity series an average of 9% as part of a dealer incentive plan aimed at retaining market share.

Other vendors, such as Compaq and Tandy, said price cuts on their existing products were unnecessary at this time.

"It's a close-out sale the best we can tell," said Ed Juge, Tandy's director of market planning, of IBM's price reductions. "You don't drop prices when a competitor closes out its product," he explained.

Compaq spokesman Jeff Stives reiterated the Houston firm's strategy of offering higher performance machines and refraining from matching IBM's price cuts. "We have no plans to react to IBM's announcement from a pricing perspective," he said. "We've not done so in the past, and we see no reason to do so at this time."

AT&T, which cut prices by 12% to 16% last January on its Models 6300 and 6300 Plus, said it is still evaluating the impact of IBM's pricing moves. "In the past, we have responded to changing market conditions with pricing actions," an AT&T spokesman said. "We expect to make similar pricing actions as market conditions change."

A spokesman for Leading Edge Corporate Products, Inc. said the firm had recently introduced a removable-cartridge Winchester drive with 20M bytes of storage for its Model D PC-compatible line that lists for $1995, including two cartridges. The company's Model 2 sells for $1,095, and a Model D2 AT compatible with a 30M-byte hard drive will be offered for $1,975.

"We've played all the cards we're going to show for now," the spokesman said.

Slow-moving Model 30 prompts dealers to deal

BY ALAN ALPER
CW STAFF

NEW YORK — Just three weeks after its introduction, IBM's new entry-level personal computer — the Personal System/2 Model 30 — is being discounted by as much as 20% by retailers that claim the system is in abundant supply and not moving as quickly as some had anticipated.

IBM, which reportedly began manufacturing the Model 30 late last year, had the system on many retailers' shelves within days of its April 2 debut. IBM is believed to have a phalanx of units coursing through the dealer pipeline in anticipation of heavy order activity. Dealer margins are said to be about 40%.

But customer response to the Model 30 so far has been tepid, dealers said, citing user confusion over where the system fits into IBM's personal computer strategy. The system does not run the unreleased Operating System/2 — expected to be the linchpin of the other PS/2 family members — and with its 3½-in. disk drives, the Model 30 cannot take immediate advantage of applications that are compatible with Microsoft Corp.'s MS-DOS and that reside on 5¼-in. diskettes without copying them onto a new disk, dealers noted.

Some dealers also say that the list prices of the two versions of the Model 30 are not competitively priced compared with other MS-DOS machines. IBM's suggested list prices are $1,695 and $2,295 for the dual-floppy version and hard-disk system, respectively.

"We've got thousands of them as a company, but I don't see them selling that quickly," noted Dan Court, a sales representative with a Businessland, Inc. outlet in New York.

Walk-in customers can receive anywhere from 5% to 15% off the list price of the Model 30, depending on the volume purchased, Court said. Businessland is also offering discounts to corporations that have a volume purchase agreement, he added.

A Computerland Corp. sales representative, who asked not to be identified, said his outlet has about 150 units of the dual-floppy version of the Model 30 in stock. His store is offering discounts of up to 20% depending on the quantity purchased.

Since the Model 30 is pointed at entry-level users — with the education market a primary focus — dealers may see discounting as a necessary pioneering sales tactic, said Tim Williams, director of micro and personal computer information services at Future Computing/Datapro, a Dallas market research firm that tracks the computer retailing business.

Unauthorized IBM resellers appear to be making the most of the marketplace confusion.

Olden Computer/Office Automation, an unauthorized IBM reseller in New York, is cutting 10%off the list price of the Model 30. The base-level, dual-floppy machine is selling for $1,525, while the hard disk-based unit is selling for $2,095, a sales representative said.

"And we'll do better than that," said an Olden sales representative who declined to be identified. "We have a lot of them, but we're not seeing much activity. People don't seem sure where they fit into their plans."

Multiuser

FROM PAGE 1

multiuser system, the company now admits that the long-term future of OS/2 involves multiuser capabilities. "It is not part of our vision for the operating system as much as it is something we will do in response to customer requirements. IBM is obviously a customer for the operating system, and we will be responding to that requirement," said Steve Ballmer, vice-president of systems software for Microsoft.

IBM's Lowe

The multiuser capacity will evolve out of IBM's more immediate plans to provide OS/2 with a high level of local-area networking (LAN) capability.

"We have a number of facilities in OS/2 that allow it to support multiple users on a LAN, so I would say the beginnings of multiuser are already there," said Lee Reiswig, systems manager for the communication and data management division at IBM's Entry Systems Division.

However, a multiuser version of OS/2 is a major long-term goal.

"Some people interpret multiuser to really mean something like shared logic, where you could support multiple users on ASCII terminals or dumb terminals. That support is certainly going to be a ways down the road," Reiswig cautioned. "There's a long-term strategy to see the need for multiuser capabilities in the operating system. We started with some already." While a multiuser version of OS/2 may be years away, such a system could provide strong competition to the wide variety of existing Unix implementations. The only Unix announcement IBM made at the introduction of the Personal System/2 family was AIX, a proprietary version of Unix that will run on IBM's Intel Corp. 80386-based Model 80.

"What people really want is a multiuser DOS type of environment. If there was a solid multiuser DOS implementation available, it would take away a great number of Unix sales," said Charles Hickey, president of Microport Systems, Inc., a developer of Unix products, some of which also run Microsoft's MS-DOS applications as tasks.

But Microsoft is confident that a multiuser version of OS/2 will not cut into Unix sales. "Unix is fairly well entrenched as a multiuser operating system in the mid-range, and even an operating system like OS/2 would have a hard time competing in that niche," Microsoft's Ballmer said.

Lowe's comments rekindled memories of the controversy that began in October 1985, when Lowe, speaking in Boston, said that IBM's PC-DOS would evolve into a multiuser operating system.

That statement brought denials from Microsoft, which in late 1985 argued that Xenix would serve as the primary multiuser operating system for microcomputers. At the time, Microsoft President Jon Shirley and Chairman Bill Gates argued that Lowe did not mean that the PC running PC-DOS would support dumb terminals but that it would provide multitasking on a network.

ISDN team scores goals in test match

BY ELISABETH HORWITT
CW STAFF

U.S. West, NEC Corp., Northern Telecom, Inc., Siemens A.G. and Western Union Corp. announced last week that they have temporarily allied to achieve two Integrated Services Digital Network (ISDN) firsts: the first ISDN-based transmission between two local access and transport areas (LATA) via an interexchange carrier; and the first data exchange between ISDN switches from two different equipment vendors.

A data call placed by a Digital Equipment Corp. Vaxmate traveled over local lines to U.S. West's Northern Telecom DMS 100 ISDN switch in Phoenix, then out to Western Union's interexchange network, then over to an NEC adjunct ISDN switch at a U.S. West Denver office and finally to an IBM Personal Computer.

The data was transmitted in packet form over the D channel of an ISDN Basic Rate Interface, which defines two 64K bit/sec. digital B channels for voice, data or video transmissions, and a separate 16K bit/sec. D channel for signaling and packet-switched data. Data traveled via U.S. West's Digipac X.25 packet-switched network to Western Union's interexchange Packet Switching Service.

In comparison, ISDN site trials that U.S. West and other regional Bell holding companies have initiated during the last few months only involved intra-LATA communications via one vendor's central office ISDN switch.

Phoenix ponders alternate PC bus standard

BY ED SCANNELL
CW STAFF

NORWOOD, Mass. — Phoenix Technologies Ltd. said last week it is exploring the possibility of establishing an alternative 32-bit bus extension to IBM's Personal Computer AT bus that is compatible with third-party add-on boards.

Company officials said they believe the bus would receive enthusiastic support from board makers whose existing products cannot be used with the Intel Corp. 80286- and 80386-based systems in IBM's recently announced Personal System/2 series. The new IBM systems employ the Micro Channel architecture, IBM's proprietary bus.

"IBM has put some high-volume options on the Micro Channel — a lot of memory, graphics, disk controllers," said Rich Levandov, vice-president of strategic operations for Phoenix Technologies. "The only thing third-party board makers can look at now is adding 4M-, 8M- and 16M-byte memory boards, and that is not a very high-volume business," he added.

Phoenix, however, is in a quandary about whether to clone the "A" Basic I/O system of the PS/2 machines, which contains many of the systems' multitasking and communications abilities. Levandov said Phoenix Technologies could produce an A-compatible product by Comdex/Fall '87. However, the decision to do so depends on how much technological and marketing sense such a move makes.

"There is no reason to write directly to the A BIOS in a protected-mode operating system. It violates the whole concept of protected mode," Levandov said.

'Program gets clobbered'

"If you have two programs vying for the computer's resources at the same time, and if one of them goes around the operating system to the hardware, it is going to get clobbered," he added. "So I don't think A BIOS will be a factor in terms of compatibility."

Copying the Micro Channel architecture would not represent a breakthrough in technology, Levandov said, but it has its risks. One is the 100 or so patents IBM has applied for in connection with the PS/2 series.

Phoenix said it will clone the "C" BIOS of the IBM systems, which allows IBM PC-DOS applications to run on the PS/2 series. IBM has made some changes to the C BIOS that affect the way existing applications run under the PC-DOS 3 family. He said the changes are minor, however, and that he expects Phoenix Technologies will make a compatible product available.

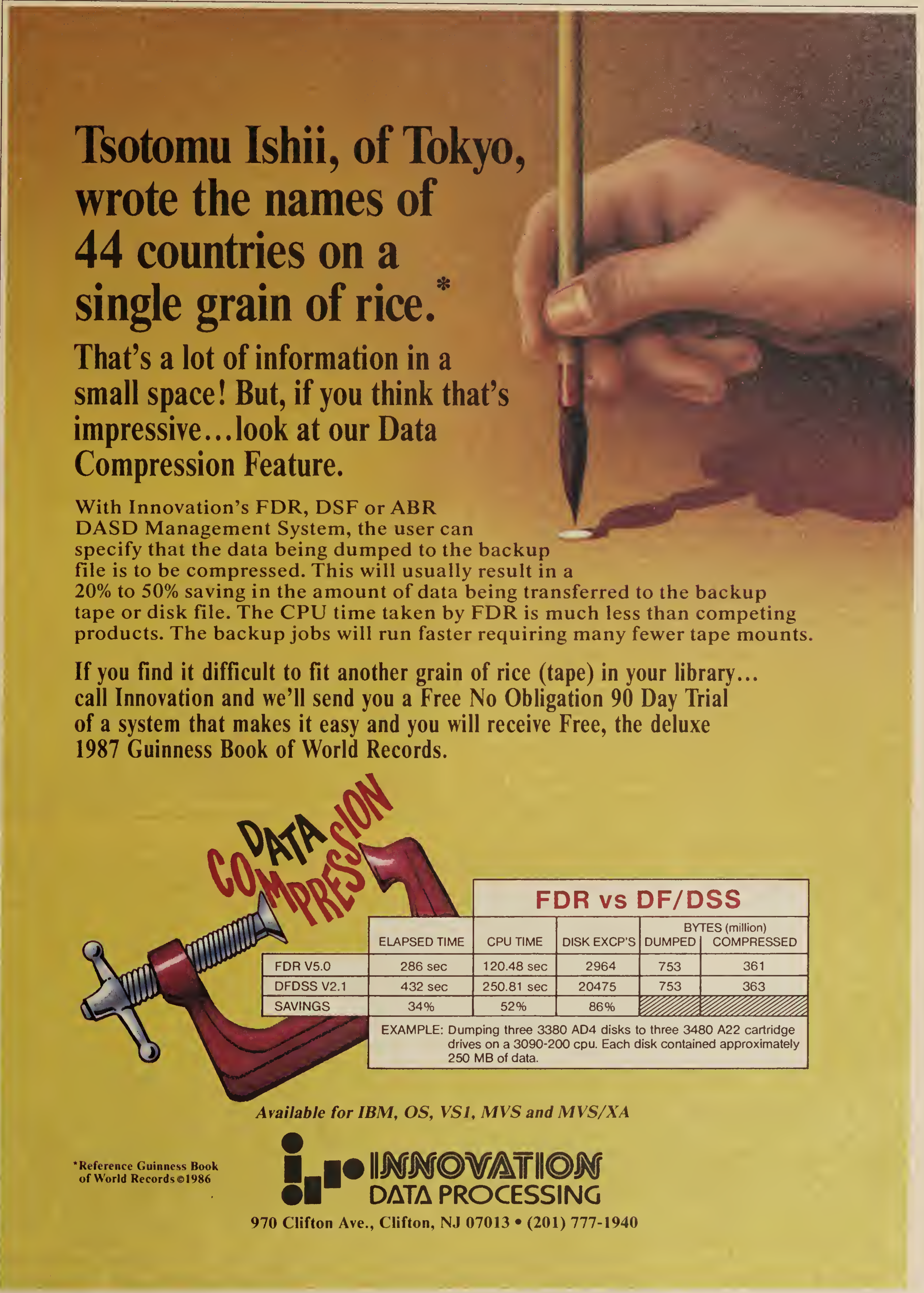
The alternative bus would also be welcomed by corporations that have a sizable investment in microcomputers, most of which have traditionally preferred third-party add-on boards, Levandov said.

"Companies with 20,000 PCs have probably bought 10,000 third-party option boards, all of which are useless with IBM's Model 50 on up," Levandov said.

Several MIS and micro managers of Fortune 1,000 companies interviewed last week confirmed Levandov's assertion, noting that add-on products of third-party vendors are usually superior to those from IBM.

"We like the IBM computers, but we don't buy IBM boards because most third parties make better ones," said Ron Goldfarb, manager of office automation for Pratt & Whitney Administration, a subsidiary of United Technologies Corp. "Instead of killing the clones, I think they [IBM] are trying to kill the Quadrams and ASTs of the world," he added, referring to Quadram Corp. and AST Research, Inc.

Phoenix first demonstrated an interest in developing an alternative 32-bit bus in July 1986, when it helped establish the Personal Computer Extended Technology (PCET) Standards Committee.



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DFDSS V2.1	432 sec	250.81 sec	20475	753	363
SAVINGS	34%	52%	86%	▨	▨

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Bank builds own distributed data base

Five years and $1M later, Chemical Bank launches unit that links multiple data bases and host

BY ELISABETH HORWITT
CW STAFF

While other companies wait for host software vendors to fulfill their promises to deliver fully functional distributed system software, Chemical Bank has gone ahead and built a distributed system based on current data bases with the help of a software and consulting company.

Within the next two months, the bank's customer-service representatives will start using the system to call up key customer and account information across multiple data bases and hosts without having to do multiple logons, download whole files or specify physical or logical locations of data.

At first glance, Chemical Bank seems to have built its basic distributed system in record time. Proposed in mid-1986, the initial system, based on Automated Information Processing, Inc.'s (AIP) Prism software, was up and running by January 30; currently, it is being tested by select service-representative groups. This near-miraculous turnaround is actually the culmination of some five years and $35 million to $40 million worth of prepositioning systems development efforts. The distributed system itself, including the user interface and applications software, has already cost $1 million, and the bank estimates that it will need to spend another $1 million to $1.5 million before the project is complete.

Upper management apparently does not grudge the price since distributed data base management is considered to be an essential component of Chemical Bank's relationship banking strategy. Leaders in the financial and investment community currently are trying to form long-term relationships in which they provide customers with the full range of financial and investment services, rather than just checking and deposit or just a credit card.

Payback to customers

The payback offered to customers includes some price breaks but primarily offers better service and support, based on the fact that service representatives are familiar with a customer's entire portfolio and financial history. In mid-1986, key senior management people at Chemical Bank got together and decided to make "a major investment to provide tools that would improve customer-service people's ability to deliver service," according to Bert Kulic, vice-president in charge of the bank's card, relationship and customer-service systems.

The group envisioned a one-stop customer-service system that would enable any service representative at a terminal to access the customer-account profile, provide financial details to support inquiries about any of the customer's accounts and, perhaps most important, offer a complete history of all interactions between the bank and the customer.

During that meeting, Kulic promised upper management that he could deliver a distributed data base system in six to eight months. At the time, he admits, he did not know precisely how he was going to accomplish this; but shortly after that he happened to meet Joseph Stadler, president of AIP, who was then working on another software project at Chemical Bank.

Found vital link

Kulic concluded that AIP's Prism software, which is currently distributed by New Software Corp. in North Attleboro, Mass., could help provide the vital link between the service representative and the bank's multiple data bases, which were — and still are — autonomous systems on different IBM 3090s in various bank sites in New York, New Jersey and Long Island.

Even with the help of Prism, Kulic's task would have been impossible if the bank had not begun to tie its data bases together several years ago with a combination of internally developed and commercial products. Like many businesses, Chemical Bank founded its information systems on a series of disconnected data bases, each of which keeps track of a different function or type of account. "Over time, we ended up with too many application systems and found ourselves dealing with a bunch of accounts rather than with a customer," Kulic comments.

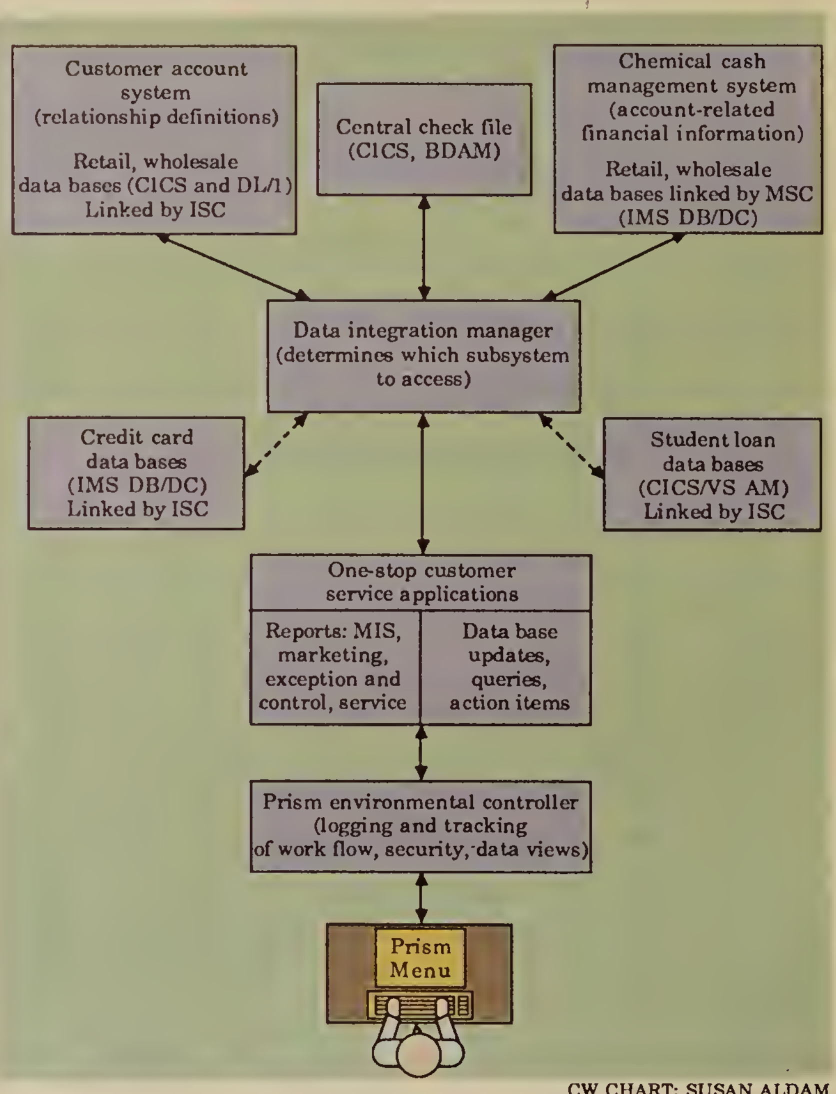
Fortunately, the company began addressing this problem approximately five years ago by building a Customer Account System (CAS) that would maintain complete profiles that showed all the relationships between a customer and different accounts maintained at the bank. Two years ago, the bank developed its Distributed Processing Interface Server (DPIS), which creates logical pathways between disparate data bases and applications. IBM's Multiple System Coupling product is used to link IMS systems, while IBM's Inter Systems Communications product links CICS systems.

By the end of last year, the basic system had been set up and certificates of deposit and checking accounts incorporated into the profiles. Service people armed with a customer name or account number could call up CAS and trace relationships with all other accounts a customer has with the bank. Through DPIS, they could then access the data they needed. However, there was still a large piece missing, according to Philip Russo, vice-president of Chemical Bank's Serviceline.

When a customer called asking about several different accounts, service representatives had to log on and off for each different data base that held the key information. Additionally, the representative had to know the rules for accessing each type of data base and how to navigate through the system to get to the information.

Chemical Bank's distributed data bases

Prism software meshes with existing data base navigation and relationship tracking tools to make one system out of many.


Customer account system (relationship definitions)
Retail, wholesale data bases (CICS and DL/1) Linked by ISC
Central check file (CICS, BDAM)
Chemical cash management system (account-related financial information)
Retail, wholesale data bases linked by MSC (IMS DB/DC)
Data integration manager (determines which subsystem to access)
Credit card data bases (IMS DB/DC) Linked by ISC
Student loan data bases (CICS/VS AM) Linked by ISC
One-stop customer service applications
Reports: MIS, marketing, exception and control, service
Data base updates, queries, action items
Prism environmental controller (logging and tracking of work flow, security, data views)
Prism Menu

CW CHART: SUSAN ALDAM

"We had individual systems that wouldn't talk to one another," Kulic explains. "My job was to bring the data from all systems to one place so we could provide an integrated view to the service agents." Kulic's people considered several architectural approaches to the problem. One workable — but expensive — possible solution was "taking relevant data from all systems and dumping it into one place each day," he says. This idea was abandoned in favor of "leaving the data exactly where it is, because each system already had on-line components, and having users ask for data interactively across the existing communication links," Kulic reports.

AIP's Prism software and the Data Integration Manager (DIM), which AIP created under contract to the bank, forged links between user data views and existing Chemical Bank data bases and applications. This saved Chemical Bank from the monumental job of "converting three zillion lines of code," which many companies see as the insuperable obstacle to achieving a distributed data base system, according to AIP's Stadler.

Another advantage is that the bank avoids the need to create user-oriented subsets of operations data bases and the related necessity of finding some way to ensure consistency among duplicate copies of data elements. "Our whole strategy is based on *not* having to duplicate financial records," Kulic notes.

Chemical Bank's distributed system combines existing software components, such as DPIS and CAS, and three new elements. First, AIP's Prism software provides a consistent set of menus and data views through which the agent interacts with the system. Prism also tracks agents' work loads, recording when each customer request is filled — a feature Chemical Bank plans to use to better coordinate work loads at some future date.

The second new component, DIM, routes data requests to the correct data base or region (see diagram). DIM is the guts of the distributed system since it allows the user to access as a single data view fields and records that may exist in different logical and physical locations.

Third, One-Stop Customer Service contains internally written application software that generates MIS and marketing reports as well as record service transactions such as stops, warnings, referrals, holds, queries and action items such as checkbook requests. One-Stop determines whether a transaction should go immediately into the Chemical Cash Management System, which provides up-to-the-minute status on customer balances, holds on checks and so on. Less time-critical transactions are sent to a posting file that will be used to update data bases overnight.

Advantages

Russo, whose group is currently testing a preliminary version of One-Stop, reports several advantages to the new system. "We're getting to access information in a format we need based on the dynamics of a call system. We also know more about the customer while we're talking," he says. Under the old system, agents rarely knew a customer's full name during a call. Now, by entering an account number, the agent can call up the customer's profile, including name, address, all accounts with the bank and history of contacts. "It's good to know that the customer called us yesterday about a specific issue," Russo comments.

Another advantage the system will provide is consistency of data access. The Serviceline division is currently helping Kulic's people design screens that can be used to look up information on any type of account. And agents can call up the information from multiple data bases without having to log on to each system separately and without having to do their own navigating: "We just stay in one system and let One-Stop do all the work," Russo says.

Since One-Stop is still in the pilot phase and will not be rolled out to all branches and selected departments until this year's fourth quarter, it is still too early to judge the system's potential, Kulic explains. "The major payback is improved service to customers," he says.

For Russo, whose group provides that service, the system promises, above all else, consistent quality: "Just like McDonald's cheeseburgers taste the same in California or in Paris, consistency of quality is important in banking," Russo adds.

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	Newport Beach	May 5
	Pleasanton	Apr 8
	Sacramento	May 5
	San Diego	May 14
	San Francisco	Apr 9, May 7, Jun 16
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CT	Hartford (Farm.)	May 5
DE	Wilmington	May 5
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GA	Atlanta	May 6
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	Springfield	May 7
IN	Indianapolis	Apr 22, May 20, Jun 25
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KY	Louisville	Apr 8
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	Rochester	Apr 16, May 14, Jun 11
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	Cleveland	Apr 1, May 5, Jun 2
	Columbus	Apr 2, May 6, Jun 3
	Dayton	Apr 21, Jun 16
OK	Oklahoma City	Apr 7, May 29
	Tulsa	Jun 16
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PA	Allentown	Apr 21
	Harrisburg	May 6, Jun 17
	King of Prussia	Apr 23
	Philadelphia	Apr 9, May 7, Jun 11
	Trevose	Jun 30
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Tandem to up distributed computing ante

Two low-end systems for outlying offices mark firm's first entry into Unix, CMOS fields

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. today is set to make its first foray into the Unix world and CMOS technology with the introduction of two low-end systems designed to bring distributed computing to sites where it was previously impractical.

More compact and priced tens of thousands of dollars less than Tandem's existing entry-level system, the CLX and LXN are intended for work groups and departments in the outlying offices of major user organizations.

Tandem also announced the Laser-LX, a printer compatible with the Hewlett-Packard Co. Laserjet.

But through support of several of the industry's most popular interconnection standards, the CLX and LXN machines reportedly can be integrated with and extend the company's current network of on-line transaction processing (OLTP) systems.

The LXN runs Unix and supports up to 32 users and three CPUs, with as much as 16M bytes of internal storage per machine. Using Transmission Control Protocol/Internet Protocol, the system also ties IBM-style workstations and Tandem terminals together in an Ethernet local-area network and uses IBM's Systems Network Architecture (SNA) or CCITT X.25 for its back-end connections.

Available in four configurations, a fully expanded CMOS-based CLX incorporates six processors, holds 72M bytes of main memory and executes 15 transaction/sec. For connections to IBM mainframes and public networks, the machine supports SNA and X.25. Through the firm's Multilan interconnection product, the CLX links all Tandem Nonstop family members to any local network conforming to Microsoft Corp.'s MS-Net or IBM's Netbios standards.

Federal Compress & Warehouse Co. has served as an LXN beta-test site for two months and reportedly plans to move the system into production on July 1.

Installed in the 25 cotton-storage facilities that Federal Compress runs in the Mississippi River delta and Arizona, the LXNs collect data locally and relay key information about each incoming bale to the user's Memphis headquarters. After being processed centrally on the company's Tandem Nonstop II CPU, the data is returned to the remote warehouses in the form of finished reports.

Prior to installing their LXNs, the field locations were equipped with Mohawk Data Sciences Corp. Series 21s, which lacked the intelligence to initiate transmissions to and from the main office. Now, however, the sites can start their communications on demand and thus avoid processing delays that can prevent end users from receiving their data on time, according to Federal Compress Vice-President and Treasurer Bob Cohen.

Although the LXN supports Unix rather than Tandem's proprietary Guardian operating system, the 32-bit machine is aimed as squarely at OLTP as any other member of the vendor's CPU family.

Tandem's intent in embracing an industry-standard operating system is, at least partly, to gain entree into government installations, auto makers and other environments in which Unix support is mandatory. "If you don't offer Unix, you can't even bid on contracts from those kinds of large organizations," said Terry Retford, the vendor's manager of processor and memory products.

Technicians need not apply

Unlike the LXN, the CLX supports Guardian and is implemented in CMOS technology, which combines comparatively high component density with low heat dissipation. CMOS's inherent properties minimize the CLX's equipment failures and thus allow users to "assume increased responsibility for their own maintenance," said Tandem watcher Omri Serlin, head of Los Altos, Calif.-based Itom International Co. "Virtually any defective board or other hardware component can be replaced without tools or service technicians," he added.

For now, the presence of CMOS components makes the CLX technologically unlike Tandem's larger and more expensive systems, which include the EXT, Nonstop II, TXP and VLX. "But in the future, the company's plans call for it to make the parts in all its other systems interchangeable with the CLX's," Serlin said.

In single quantities, a minimum LXN with one 2M-byte processor costs $23,700, compared with $57,000 for a basic CLX with a 4M-byte CPU.

The 8 page/min Laser-LX costs $2,595.

Although the LXN is available now, shipments of the first two CLX configurations and the Laser-LX are unlikely to begin until the second and third quarters, respectively.

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* Washington University Center for the Study of Data Processing as reported in the 11/15/86 DATAMATION, pp 79-86.

Wang interlocks image and data processing

BY NINAMARY BUBA MAGINNIS
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. last week unveiled a VS-based integrated image processing system that can automatically store and retrieve images from microfilm, optical disks and magnetic media.

The Wang Integrated Image Systems (WIIS) combine image processing with data processing, office automation and communications capabilities, company spokesmen said. Also last week, Wang reported that third-quarter earnings exceeded the break-even point the firm had previously targeted (see story page 103).

WIIS configurations can start small and be expanded to larger, more expensive configurations, including optical jukeboxes, as the users' needs expand, according to Wang. The systems include multiwindowing image workstations with a 16-in. diagonal 200 by 200 dot/in. bit-mapped monitor. Resolution is sufficient for reading fine print on insurance claims forms, and handwritten information appears smooth, without "stair-stepping," according to Wang.

For many users, image processing is still too expensive to be practical, according to Stephen Keese, a consultant in systems strategies for Boston-based John Hancock Mutual Life Insurance Co. The image workstation, for example, is listed at $8,950.

"That's close to the cheapest that any of them have got, but it's still too expensive," observed Keese, who has evaluated image processing systems from the Rochester, N.Y.-based Eastman Kodak Co. and Costa Mesa, Calif.-based Filenet Corp. as well as systems from Wang.

"You have to have cheap terminals, and $8,000 is not cheap. The VS architecture is fine for distributing images, but without inexpensive image terminals, it's very expensive to start off with and also very expensive to grow," Keese added.

The image processors are targeted at banks, insurance companies, medical institutions, law offices, corporate legal departments and accounting and investment firms. WIIS will also be targeted at federal, state and local government agencies to track such image information as personnel files, social services and welfare records, inquiry or request files and legal case files, according to the vendor.

Wang's image processing technology is based on its earlier product, the personal computer-based Professional Image Computer (PIC) that was released in October 1983. The PIC was a product without a job, noted Judith S. Hurwitz, news editor and consultant for the Boston-based Patricia Seybold Office Computing Group.

The vendor learned from its mistakes, noted company President Frederick A. Wang. To rectify issues that were raised by PIC, the company formed a Product Advisory Council consisting of MIS managers, Wang said.

Frederick Wang

Council member David Jensen, director of computer services at Massachusetts General Hospital, said his computer center is a non-Wang installation interested in a system that can streamline patient recordkeeping.

Initial cost justification of WIIS showed the system was too expensive to implement, Jensen reported. Yet Wang improved its technology to make the system less costly, he added. "I'm convinced Wang listened to users to understand customer needs," Jensen said.

Although image workstations alone support the windowing environment and display images, standard VS workstations can perform document searches, copy the image from film or optical storage to magnetic disk and print documents on host-based laser printers, the vendor said.

Larger WIIS configurations include an optical jukebox with a robotic arm that moves platters from storage to the optical disk drive and Image Transfer Controllers that off-load device management from the VS computers and compress images coming from film-storage devices.

Complete systems also include stand-alone optical drives, scanners and cabinet-mounted optical drives. .

Systems start at $100,000. Medium-range configurations that support 10 users include a VS 65, a scanner and optical disk drives and range from $250,000 to $300,000. A 20-user high-end configuration based on a VS 7120 with 16M bytes of memory, printers and optical, magnetic and film-storage devices range in price from $750,000 to $1 million.

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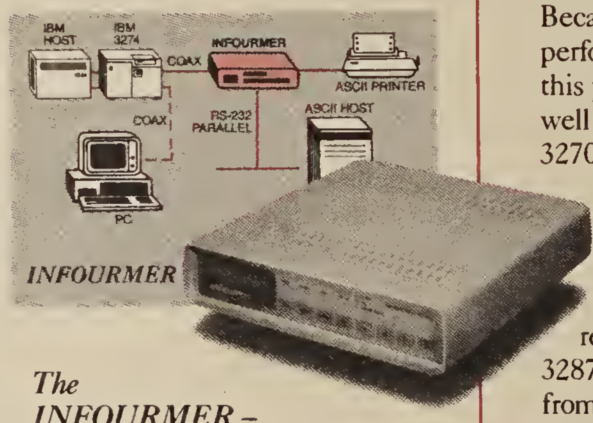

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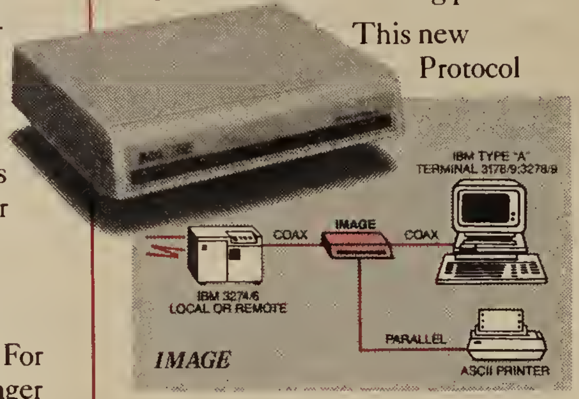
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- 32. Programmer, Methods Analyst
- 35. Dir., Mgr., Suprv., OA/WP
- 38. Data Comm. Network/Systems Mgt

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ETA preps

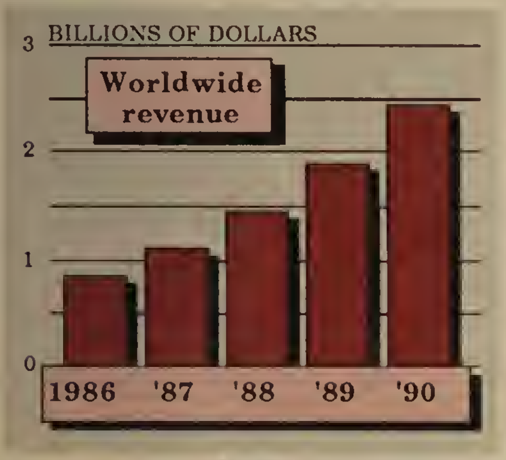
CONTINUED FROM PAGE 1

cess an additional 128 million words.

Each CPU cabinet is about 4 ft long, 2 ft high and 3 ft wide. The 800-MFLOPS CDC Cyber 205 now used by Florida State stands 7 ft high and is 17 ft long by and 10 ft wide. The Cyber 205 CPU uses 8,500 chips, compared with 240 chips in the ETA-10.

Florida State's system, being purchased under a U.S. Department of Energy (DOE) grant, is in place in the university's computing center — a building still receiving the finishing touches of construction crews. But the supercomputer remains under ETA Systems' control — to the extent that ETA employees control access to the computer room — as it undergoes debugging.

Super market
Supercomputer sales projected to average 30% growth rate



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CW CHART

Despite any problems, Florida State officials remain enthusiastic about the system and its eventual official acceptance.

The ETA-10 was scheduled to arrive in June, but it was brought in early when ETA Systems asked to use Florida State as a test site. That left ETA Systems with six months to prepare the machine for formal acceptance by the university.

"That six months will not be sufficient to test the machine out. We expect it will be close to a year before they get to where we can accept it," says Robert M. Johnson, Florida State vice-president of research and graduate studies. "They ran a job on March 26 and had some memory problems afterward. But it seems like it is progressing fairly well. They are just behind on the software, which is something all vendors run into."

ETA Systems has run two more demonstration tests since that March 26 trial exercise, one for the DOE and one for Florida State users.

A company spokesman said those tests generally went well and that the "few glitches" that occurred were of the nature that could be expected, particularly where the tests were the first for ETA's proprietary operating system.

The ETA-10 will be the key system in Florida State's supercomputer center, which will serve scientists on campus and across the U.S. The center will house various technical systems in a building about two miles from the central campus. Those systems include the interim-host Cyber 205 now in leased space. Others include smaller CDC Cybers and two Harris Corp. superminicomputers.

The center is funded largely by the DOE and the state of Florida. "I think a lot of people are envious of what we have been able to do. Sure we would like more money; we'd all like to have more. But we have been able to provide a return on the investments with the development of the institute. We also wouldn't have the DOE contract without the state's help," Johnson says.

The five-year DOE contract, signed in 1984, provided the university with $44 million. CDC and the state are each donating another $1 million per year. The remainder of the $63 million, five-year budget will be covered by front-end charges to users.

Johnson says the DOE grant was a model for other supercomputer centers, some of which received National Science Foundation grants two years ago. Rather than the DOE donating equipment, Florida State equipped its center by the DOE paying access fees for 65% of the CPU time on the Cyber 205, and later on the ETA-10.

The Cyber 205 cost $12.3 million and is being traded in for $6 million toward the $12.9 million price of the ETA-10.

DOE access is scheduled by DOE officials, who allocate CPU time for general, nonclassified research by various DOE facilities throughout the U.S. The 35% of CPU time that is not used by the DOE is allocated by a committee of university scientists.

The committee meets quarterly to review about 30 time requests from Florida State and other organizations. Those requests come in the form of proposals by researchers who must explain the benefits of their work and justify use of a supercomputer.

"Generally, we end up giving them some time, but it may be less than they asked for," says John W. Nall, deputy of the Office of Computer and Information Resources and a member of the committee.

Nall also oversees research and instruction systems including two CDC Cyber 730s, a Cyber 760 and the two Harris systems.

The systems are tied to several networks, including the Florida Information Resources Network connecting all of Florida's state universities and colleges. DOE researchers access the supercomputer center through the DOE's Magnetic Fusion Energy Network. Other links include a network based on the U.S. Department of Defense's Arpanet and the State University Network.

Center located in office park

The supercomputer center, in a state-developed office park on the outskirts of Tallahassee, is linked to the main campus via a 2.62-mile, 330-MHz communication line that will support 20 T1 circuits.

The center was designed to support the ETA-10 and several smaller systems, and it will house offices for researchers and administrators.

The center was designed to keep the ETA-10, printers, tape drives, communications facilities and the ETA-10's operator console in separate but adjacent rooms. A room housing power supplies and cooling equipment adjoins the computer room.

That cooling equipment is particularly important to the ETA-10 because the supercomputer's circuits are in a metal tank containing liquid nitrogen, which is continually circulated and reconstituted to maintain the environment at below 320 degrees.

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AI pendulum swings to general-purpose firms

BY ROSEMARY HAMILTON
CW STAFF

When Gregory Richardson, a vice-president at a New York consulting firm, launched an artificial intelligence development effort last year, he chose to use a Sun Microsystems, Inc. workstation instead of a dedicated AI system.

Richardson is one of a growing number of users causing a major shift in the AI market. These users are turning toward general-purpose computer vendors for lower cost AI systems that can be integrated with general-purpose systems.

Earlier this month, Lisp Machine, Inc. declared bankruptcy. Symbolics, Inc., the AI systems market leader by a wide margin, has notched two consecutive losing quarters in its current fiscal year while also recently laying off nearly 20% of its work force.

Meanwhile, Sun Microsystems claims that 6% of its $210.1 million in 1986 revenue came from AI-related sales.

"The emerging capabilities of LISP on a general-purpose workstation have become very acceptable," says William Wise, vice-president of marketing at Lisp Machine.

A number of factors have come into play during the last two years that have caused this shift. In the early 1980s, dedicated AI systems were a hot new item. Selling primarily into research and government markets, Symbolics was able to pass the $100 million revenue mark in 1986.

Users in these markets, involved with advanced and experimental AI work, were willing to shell out the typical $100,000 price for a system.

"It was easy in the early days. They [general-purpose computer vendors] were growing at more than 50% a year. They thought everybody wanted a LISP machine, but that wasn't true," says Harvey Newquist, editor of "AI Trends," a newsletter published by DM Data in Scottsdale, Ariz.

But as more commercial users pursued AI development plans and as more AI development software became available for general-purpose systems, the heady days for the dedicated-systems vendors came to an end.

And as more AI applications were developed, the need for low-cost systems to run these applications increased. Users generally did not want a high-performance system that cost $60,000 or more to run an AI application. General-purpose vendors were better able to provide these systems, known as delivery systems to contrast them with development systems.

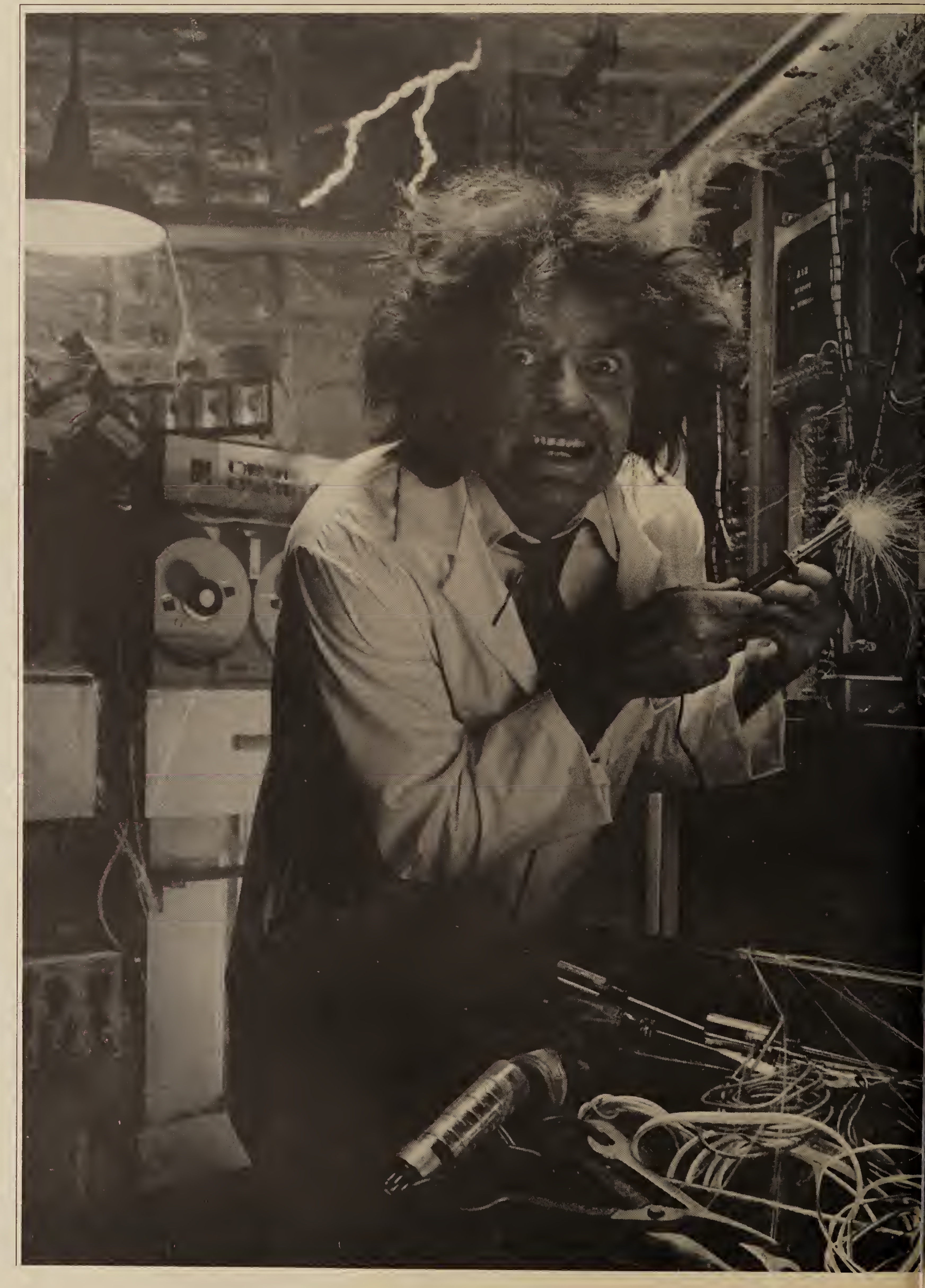
Richardson, vice-president of product development at Performance Evaluation Resources, Inc., is developing an expert system that would assist in pension fund management. He uses the Sun-3/160 workstation running Common LISP from Lucid, Inc. "We're in a start-up situation, so we don't have the staff, the financial resources or the time that goes with an advanced development system," he says.

"At some point, we might want to distribute this system to our regional offices. Symbolics didn't have a good delivery vehicle," Richardson adds.

Industry analysts say they expect to see vendors like Sun, Apollo Computer, Inc. and DEC continue to gain strength in the AI market, while companies like Symbolics will become niche players by offering high-performance development systems.

However, Symbolics Chairman Russell Noftsker does not see things that way. He acknowledges the market shift but attributes the quarterly losses to price cuts and a product introduction last year that cut back demand while users waited for the new systems.

Furthermore, he says Symbolics can provide both development and delivery systems — it has a $40,000 low-end product — and does not plan on becoming a specialized company.



Uccel heeds users, will continue ADC2 support

BY JAMES A. MARTIN
CW STAFF

INDIANAPOLIS — Backing down in the face of considerable heat from users, Uccel Corp. has reversed its decision to withdraw support for the popular ADC2 mainframe scheduling software package it acquired last year.

At a recent meeting attended by some 40 users of Automated Data Center Job Scheduling and Producton Control (ADC2), Uccel said it will continue to support ADC2 Version 2.3.0, the most recent release, indefinitely for all existing users. The previous release, Version 2.0, will be supported until the end of this year. Uccel had originally announced support for Version 2.0 only through March.

The meeting was arranged by ADC2 users in response to Uccel's recent announcement that it was removing ADC2 from the market immediately and would discontinue supporting Version 2.3.0 in December 1988. ADC2 was formerly a product of The Cambridge Systems Group, Inc., which Uccel acquired in December 1986.

In its February notice to ADC2 users, Uccel said it was discontinuing ADC2 in favor of its own UCC-7 because it was not feasible to support two IBM MVS environment schedulers. Uccel had offered ADC2 users the chance to convert to UCC-7's basic package at no cost and to the UCC-7 full-function package for $7,500 [CW, March 9].

In addition, Uccel originally said it would offer two free seats to each corporate ADC2 user at a regional UCC-7 training session and gave ADC2 users until April 30 to decide whether they wanted to take advantage of the conversion program.

ADC2 users found themselves suddenly pressured not only to decide whether they wanted to switch to UCC-7 but to choose among various other competing, yet similar, scheduling packages. Vendors such as Southwest Software Services, Inc. and Bennett Software, Inc. made special offers available to entice disgruntled ADC2 users to their own software packages [CW, March 23].

UCC-7 incentives

In an effort to encourage conversion to UCC-7, Uccel said users will not have to attend regional training seminars and will now be provided with two days of on-site technical assistance for the UCC-7 conversion at no cost other than travel expenses, according to Craig Stall, Uccel's vice-president of marketing.

Uccel has also developed an automated conversion program to assist ADC2 users in converting to UCC-7, Stall said. "It's a program that will read the ADC2 data base, analyze it and load the UCC-7 data base with 60% to 90% of the information it needs to do the scheduling in UCC-7."

Uccel had actively sought to participate in the ADC2 users group meeting to discuss users' problems, Stall said. "Our intention was to put together a program that best met the needs of the users, and we think there will be universal appeal for this offering," he added.

Stall, representing Uccel at the meeting, "took a fair amount of negative criticism, subsequently made a conference call back to Uccel and, half an hour later, came back to announce the concessions and changes in their policy," said Robert Marsh, a supervisor for the computer services department at Dow Corning Corp. in Midland, Mich.

After Uccel announced it would discontinue support for ADC2, Dow Corning users were faced with having to convert to — and train for — another scheduling system. "Anything we considered changing to was going to provide less than what we have now," Marsh said.

Support for ADC2 will eventually be phased out, according to Stall, but only after the package's some 130 users have converted to another system.

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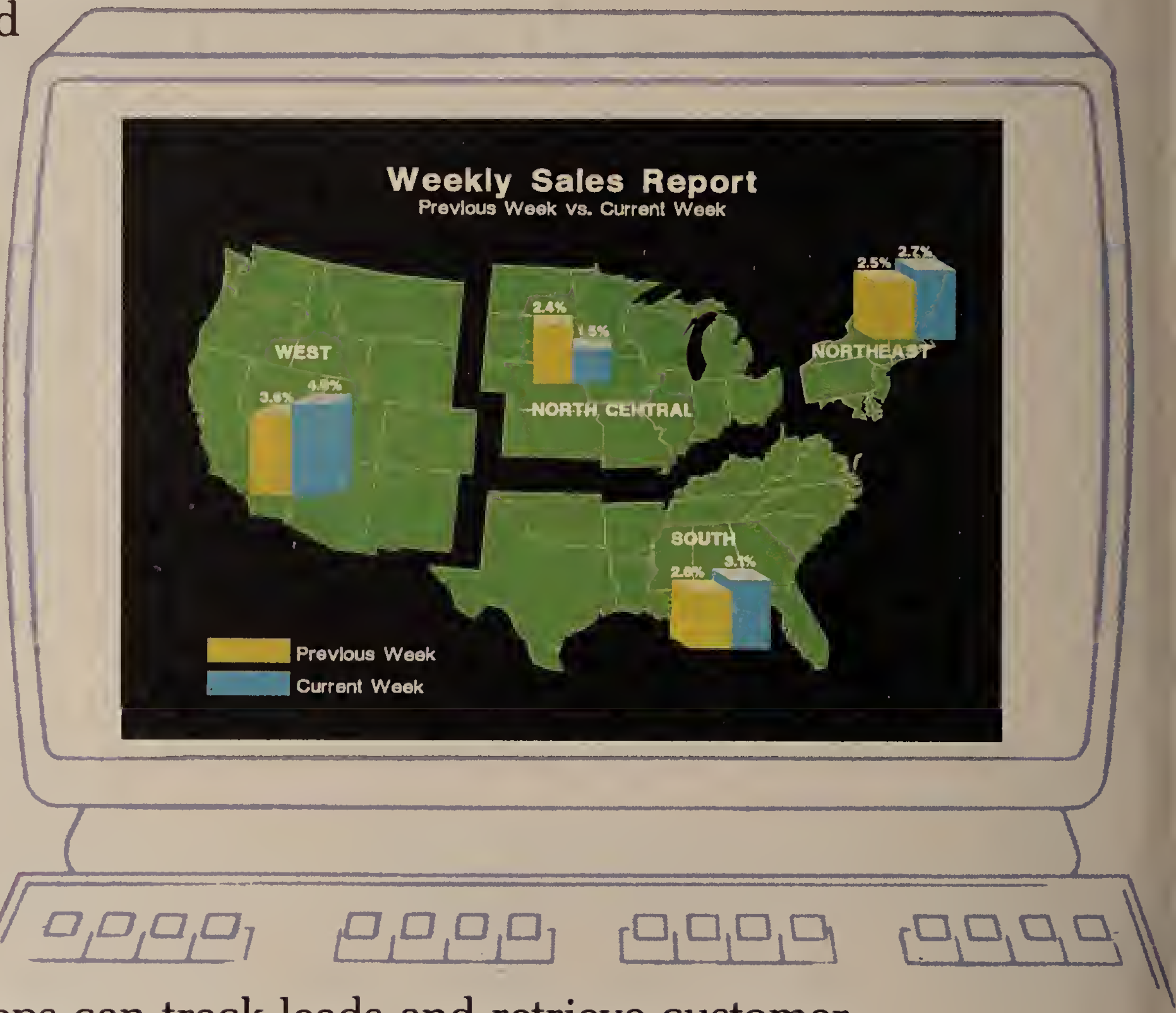
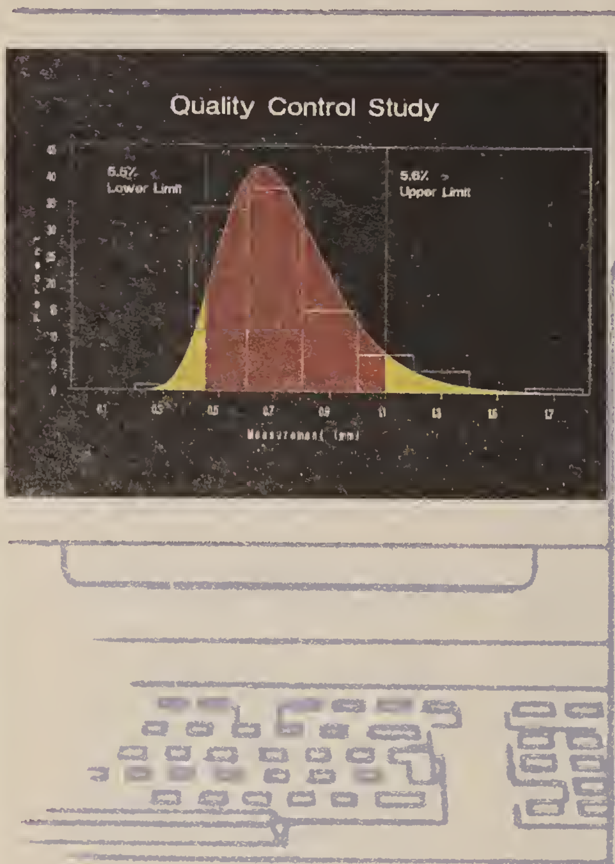
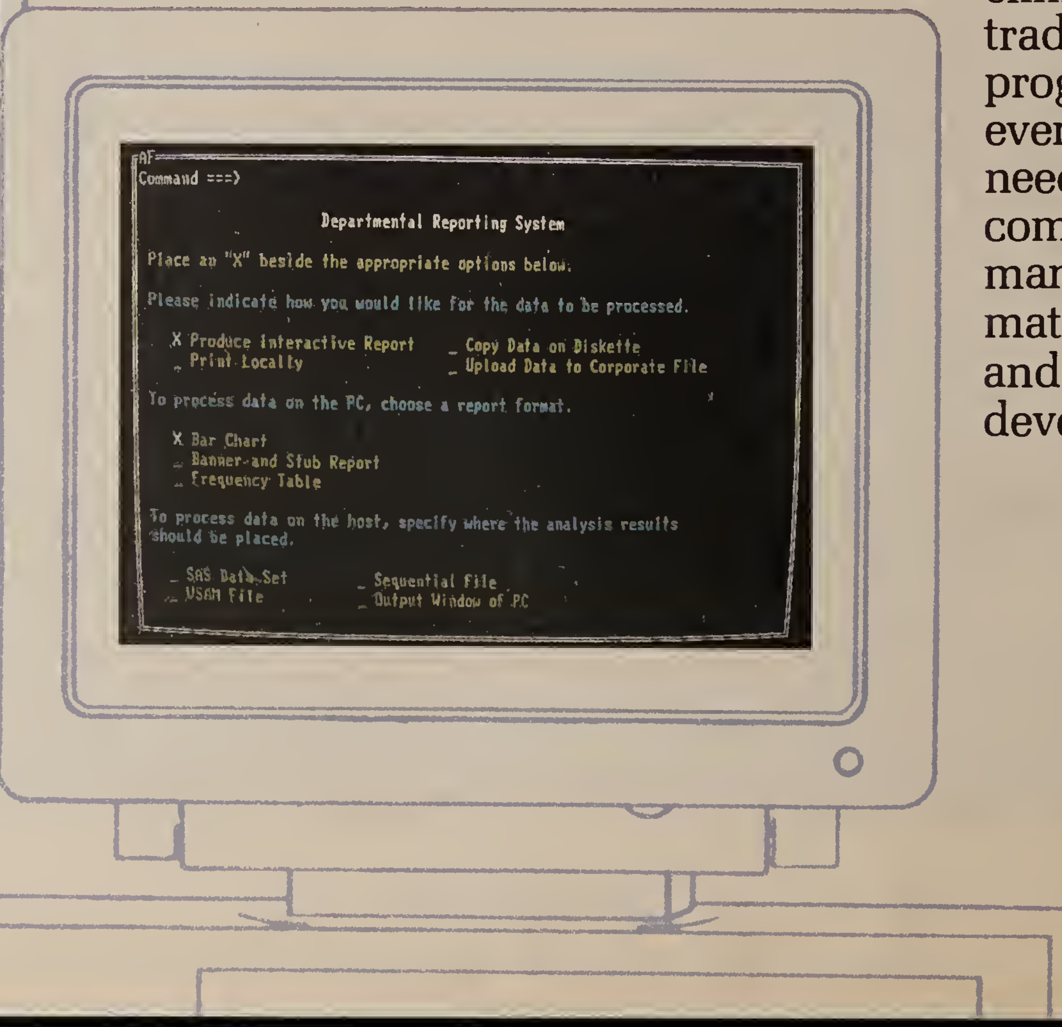






```
AF
Command ===>

                    Departmental Reporting System

Place an "X" beside the appropriate options below.

Please indicate how you would like for the data to be processed.

  X Produce Interactive Report       _ Copy Data on Diskette
  _ Print Locally                    _ Upload Data to Corporate File

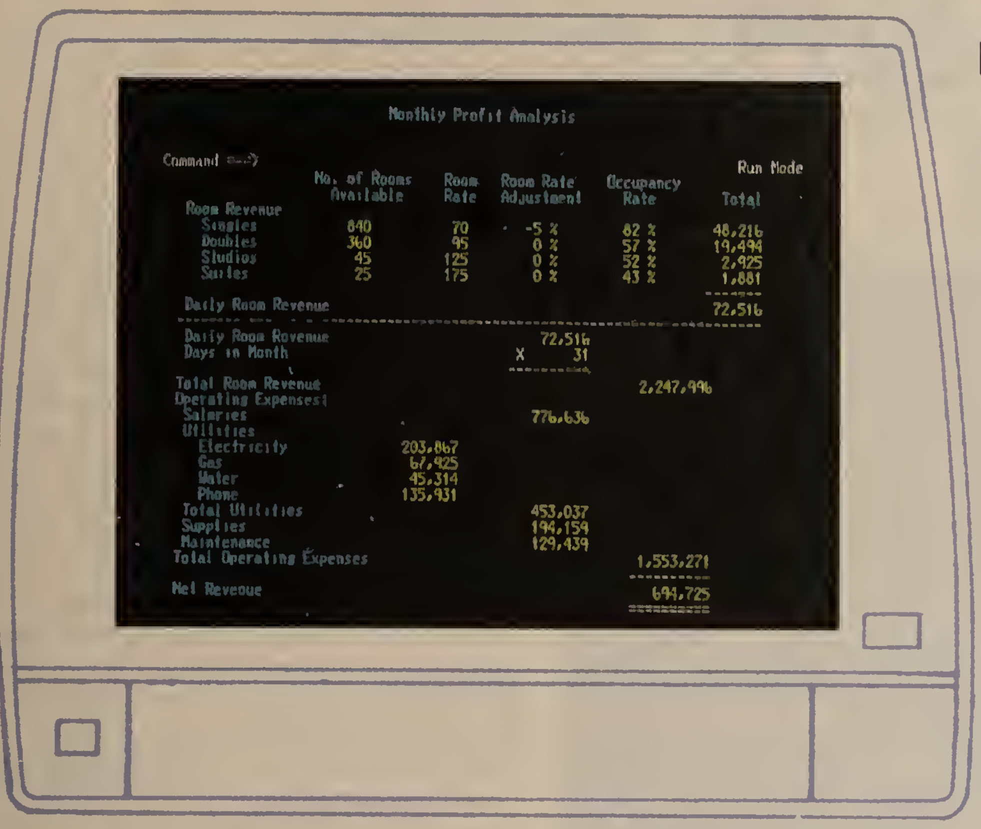
To process data on the PC, choose a report format.

  X Bar Chart
  _ Banner-and Stub Report
  _ Frequency Table

To process data on the host, specify where the analysis results
should be placed.

  _ SAS Data Set           _ Sequential File
  _ VSAM File              _ Output Window of PC
```

SYSTEM



```
                         Monthly Profit Analysis

Command ===>                                                          Run Mode
                   No. of Rooms   Room   Room Rate    Occupancy
                    Available     Rate   Adjustment     Rate           Total
  Room Revenue
    Singles            840         70      -5 %         82 %          48,216
    Doubles            360         95       0 %         57 %          19,494
    Studios             45        125       0 %         52 %           2,925
    Suites              25        175       0 %         43 %           1,881
                                                                     -------
  Daily Room Revenue                                                  72,516
 ---------------------------------------------------------------------------
  Daily Room Revenue                          72,516
  Days in Month                            X      31
                                           ---------
 Total Room Revenue                                        2,247,996
 Operating Expenses:
   Salaries                                  776,636
   Utilities
     Electricity             203,867
     Gas                      67,925
     Water                    45,314
     Phone                   135,931
   Total Utilities                           453,037
   Supplies                                  194,159
   Maintenance                               129,439
 Total Operating Expenses                                  1,553,271
                                                          ----------
 Net Revenue                                                 694,725
                                                          ==========
```

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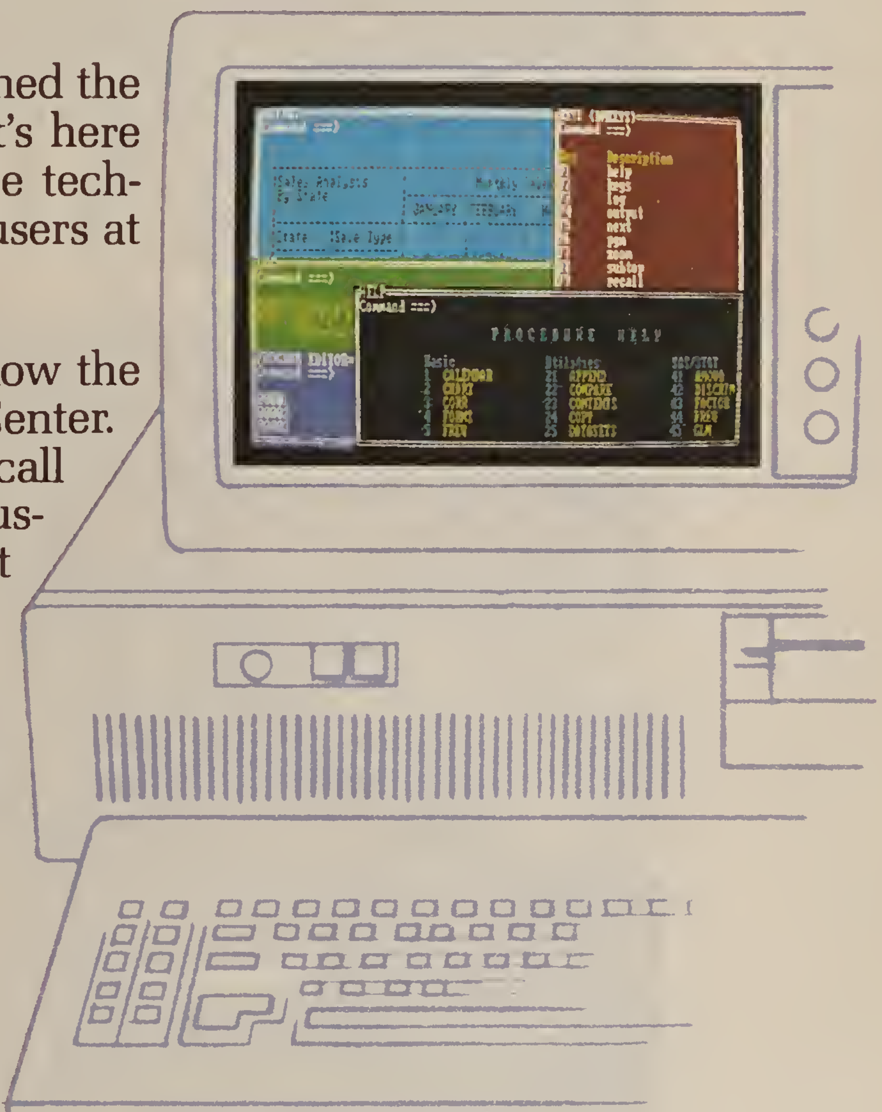

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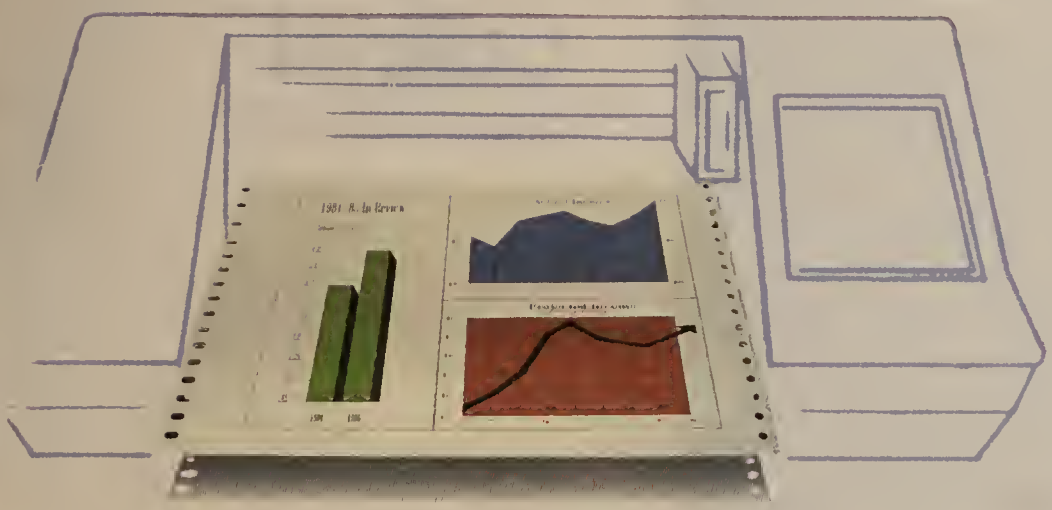

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Face-lift aim to get Multimate back in race

BY DAVID BRIGHT
CW STAFF

TORRANCE, Calif. — Answering users' demands, Ashton-Tate announced last week that it has added document orientation and several other improvements to its Multimate Advantage word processing package for the IBM Personal Computer.

The page-oriented Multimate was once one of the most popular word processing lines but recently has been surpassed by document-oriented programs such as Wordperfect Corp.'s Wordperfect and Microsoft Corp.'s Word.

The rejuvenated Multimate Advantage II package was designed for the new class of managerial and professional users who need faster, easier to use software, Marketing Vice-President Lydia Dobyns said. This class accounts for nearly half of Multimate's 500,000 users, she said. Multimate's traditional customer base consists of secretarial and administrative workers.

The $565 package offers users the choice of moving through a document on a continuous or page-by-page basis. Other features include an optional pull-down menu interface consistent with those in the company's Dbase III Plus, Framework II and Rapidfile packages; the ability to merge files with Dbase files without leaving Multimate; a continuous Undo function for recovering erased text; and the ability to handle a greater number of fonts for laser printers. According to Ashton-Tate, the package is faster than previous versions in several areas: page-to-page scrolling, sending output to laser printers, searching and replacing and spell checking.

Upgrades from any version of Multimate are available for $100. Multimate Advantage II is also available on 3½-in. floppy disks for operation on IBM's new Personal System/2. A Premium Pack with both 5¼- and 3½-in. disks is priced at $595. The package is available now.

Xerox adds to publishing system line

BY ALAN J. RYAN
CW STAFF

ROCHESTER, N.Y. — Xerox Corp. added four models last week to its Xerox Desktop Publishing Systems (XDPS) line for users who already own laser or ink-jet printers.

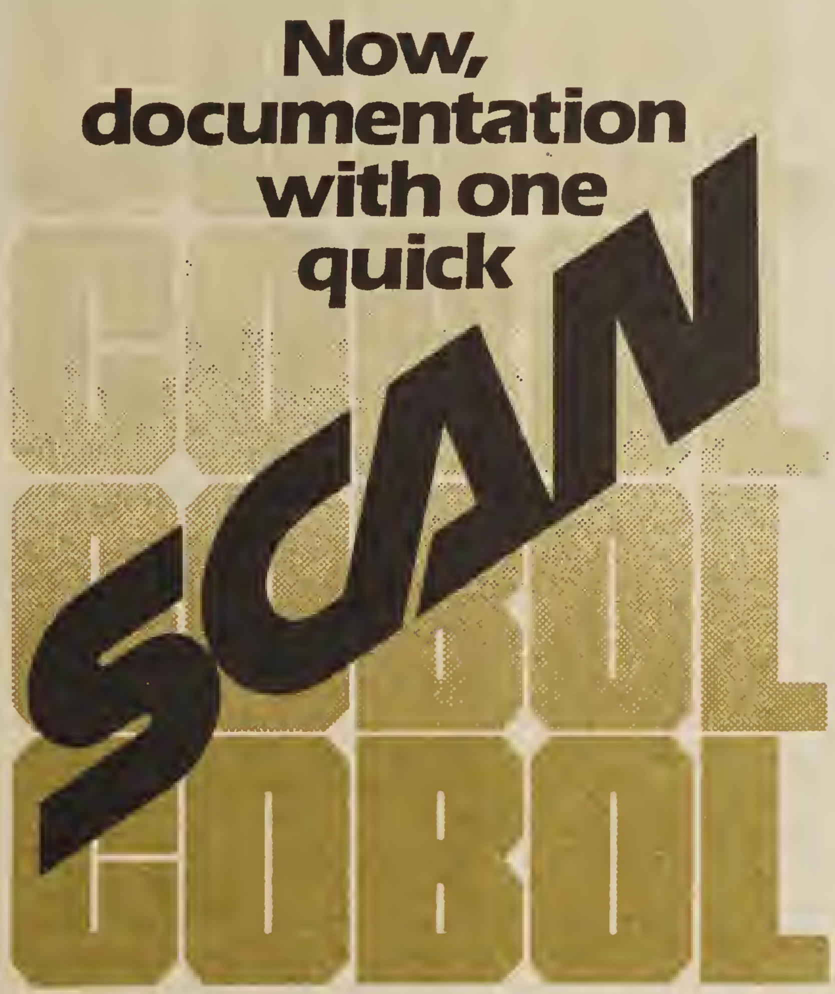
The addition follows a February announcement in which Xerox introduced the seven-system XDPS line. The latest configurations were not announced in February, company spokesman Daniel Minchen said, because the pricing for systems without printers had not been set.

Minchen said the new configurations were created because "a corporation or individual may have existing printers in place and may not need that component to make it into a desktop publishing system."

Analysts called the new models "practical." "It's always wise marketing not to force people to buy a peripheral they already own," said Joe Cross of Future Computing/Datapro in Dallas.

Included in the systems, which are available now, is Release 1.1 of the Xerox Ventura Publisher Edition software, which reportedly offers 80 new features.

Also included are a Xerox 6065 personal computer or 6068 PC-based word processor with a 20M-byte rigid disk drive and 640K bytes of internal memory; full- or partial-page monochrome or color display and operating system software. Prices range from $4,595 to $6,095.



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EDITORIAL

Moving ahead

The federal government has long been a favorite target for critics of bureaucracy and waste. It is therefore refreshing to see a federal agency take the lead in reducing the amount the government spends on computer systems.

The U.S. General Services Administration (GSA), in rare cooperation with the Reagan administration and the Office of Management and Budget, has taken steps in the last year to drastically pare down the government's long lead time for acquiring computers. Under the newest GSA policy, the agency will designate a single manager to shepherd computer purchases. The policy follows on the GSA's "Go for 12" program, announced in September 1986, that seeks to cut the time required to buy major systems from a three-year average to 12 months. Few organizations are in greater need of repairing their computer buying policies than the government, whose systems are, on average, twice as old as those in Fortune 500 firms. It is ironic that systems that affect so many can be, in the words of GSA Administrator Terence C. Golden, "already one generation behind by the time [they land] in our computer room."

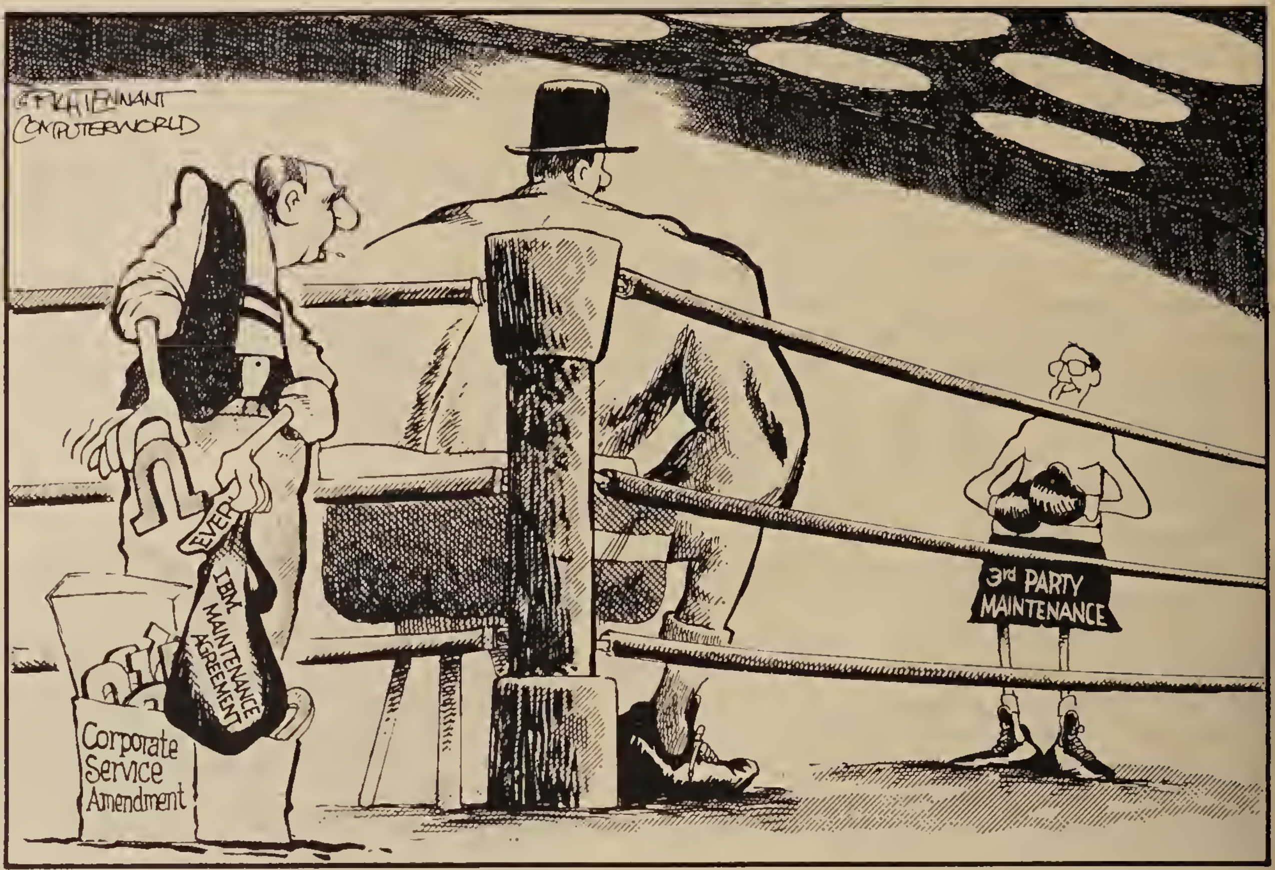
It is still too early to assess whether the new GSA initiatives will work; results from the "Go for 12" program aren't due for more than a year, and previous GSA programs have been disappointing. But it is heartening to see the administration, the GSA and federal agencies cooperating in an area that touches so many people.

Saluting glasnost

Recent sounds emanating from Rye Brook, N.Y., indicate that the spirit of *glasnost* — the trendy new Russian term for openness — is not limited to the Soviet Union. IBM, long regarded by analysts and the press as Fort Knox when it comes to public information, appears to be cracking open its doors a bit and offering the world a glimpse of its motives and intentions.

In recent weeks, reporters have had an easier time reaching IBM's public relations staff. And those representatives, whose efforts to limit information flow have reached almost comic proportions in the past, have become noticeably more helpful. Top executives are making themselves available for interviews. Responses to reporters' technical questions have been more forthcoming. Phone calls are returned quickly and often contain relevant information rather than the traditional IBM refusal to comment.

We applaud IBM's new, more cooperative attitude toward those who disseminate and analyze information about the company. Such openness ultimately benefits the reader by preventing errors and speculation from finding their way into print and by enabling information providers to spend more time interpreting the facts and less time searching for them.



LETTERS TO THE EDITOR

FCC certification

Your publication and others have featured articles and reviews of performance of personal computers and PC clones. Unfortunately, in most cases the reader has not been informed about the required Federal Communications Commission certification for the sale and use of PCs and clones.

Many advertisements claim FCC approval, which is meaningless for computing devices. Class B computing devices are those computers and peripherals that are marketed for use in a residential environment. They must be tested for compliance with FCC radio-frequency emission limitations and have an FCC identification number visible on the exterior of the device at the time of sale.

Noncertified computers frequently cause interference to television and radio reception at a significant distance. In addition, the same conditions that allow radio-frequency emissions to escape the computer will also allow strong radio signals from nearby transmitters to interfere with the computer's operation.

The FCC has been conducting a vigorous enforcement campaign for more than a year and has issued fines totaling several hundred thousand dollars to those who manufacture, assemble, advertise or offer to sell or lease, ship, distribute or use uncertified personal computers. Those who purchase and use uncertified computers at home are at risk. In addition, those users who cause harmful interference to television or radio reception by the use of a certified computer must cease use immediately until the interference is stopped.

Anyone with 300 or 1,200 bit/sec. modems may verify the certification status of any personal computer by using the FCC Public Access Link (PAL) by calling (301) 725-1072. This service allows direct access to the FCC data base. It is user friendly and menu driven. One enters the FCC identification number for the computing device in question and is informed about the certification status of that model. Each access is limited to five minutes to insure maximum availability to other users.

J. J. Freeman
National Coordinator
Computer Marketing
Enforcement
FCC
Virginia Beach, Va.

This week in history

April 18, 1977
Mentally and physically handicapped preschoolers living near Lexington, Ky., are learning by playing with common toys converted to computer terminals. The toys are the typical department store variety — clown-faced boxes, multicolored kick panels and "busy boxes" — that are electronically modified by the University of Kentucky's Department of Special Education.

April 19, 1982
Tracy Kidder is awarded the Pulitzer Prize for general nonfiction for his book *The Soul of a New Machine.* The book chronicles the development of Data General Corp.'s MV-8000 32-bit supermini, code-named "The Eagle."

Denormalize or not

In regard to William Inmon's article "Denormalize for efficiency" [CW, March 16], many arguments can be made for not denormalizing data. One is that a denormalized data structure may result in poorer system performance due to the longer record length of each table entry. Modern computer systems generally read "blocks" of data with each disk access. Each block contains a minimum of one record but generally many more.

For example, a 512-byte block can contain four 128-byte records but only one 300-byte record. Adding extraneous information to a normalized record may have the opposite of the intended effect and increase the number of disk I/Os necessary to complete a transaction due to a decrease in the number of records per block.

In the author's example, the supplier's name, address and phone would likely be dead weight when accessing part-number information for the printing of packing slips and invoices.

When one adds the costs of additional storage, increased software maintenance time, a decrease in the suitability of the data structure for fourth-generation language programming and a great increase in the difficulty of testing and auditing, the decision to denormalize a data structure appears a poor choice among the many alternative means for achieving greater system performance.

Joel Martin
Director
Development Computing
Services
Harvard University
Cambridge, Mass.

Fostering a green-eyed monster

FREDERIC WITHINGTON

We sympathize with Bob Cratchit in Dickens' "A Christmas Carol" because Scrooge was mean to him and because he loved Tiny (sob!) Tim. But we do not sympathize with Bob Cratchit, the systems professional. Shivering on his stool all day long, making obscure entries, he symbolizes the "green-eyeshade mentality" — formal, nit-picky, often irrelevant to management's needs for information.

But think of the functions Cratchit performed, expressed in modern systems jargon:

1. He was a data architect. We don't know whether Cratchit defined the chart of accounts for Scrooge & Marley, but clearly he handled changes and exceptions without direct supervision.

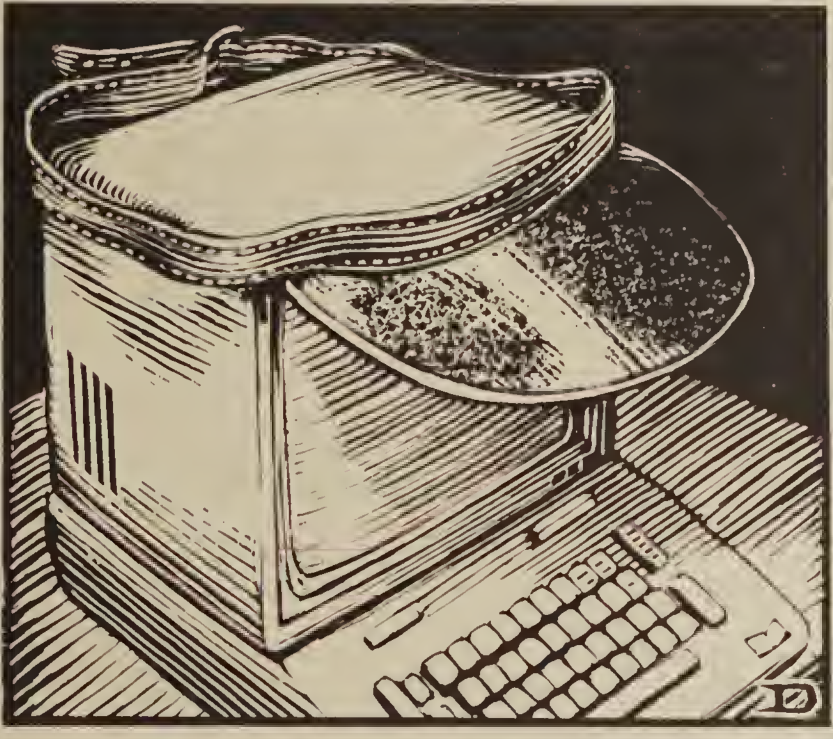
2. He provided a data dictionary. He assigned all transaction descriptors personally.

3. He used a fault-resistant data entry system. Double-entry bookkeeping provides virtually complete protection against single errors of either arithmetic or classification.

4. He provided a flexible interface to the data base. The entries were visible in Arabic numerals and the Roman alphabet, and Cratchit was always there to interpret.

Without someone or something performing Cratchit's green-eyeshade functions, all file-based systems are likely to become useless because of inconsistency and inaccuracy. Here are two examples of file-based systems created carelessly by end users:

Example A is a system developed to collect reports of adverse drug reactions. Doctors sent their reports to a government processing center for analysis. It was hoped that using standard medical terminology, backed up by a synonym dictionary in the main computer, would provide uniformity.



BOB DAHM

But the reports varied so much that the computer could not make clear correlations. Only human analysts, deriving suspicions from the forms and calling the originators to verify the facts, could produce useful results.

Example B is a decentralized inventory control system. The item-numbering systems had been created centrally, and reporting frequency was mandated, so central management expected uniform reports from locally created processing systems. Nevertheless, one site reported fewer out-of-stock conditions than the others, even though management received an abnormal number of complaints about its performance.

Investigation revealed that the system designers at that site had taken advantage of due dates. When an out-of-stock item was ordered, their system would compare the date the item was wanted with all the open reorders to see whether any new stock might arrive in time. If it might, the site did not see itself out of stock. If the stock failed to arrive in time, however, the ordering party, without warning,

Continued on page 22

A 30-year veteran of the computer industry, Withington was a vice-president of Arthur D. Little, Inc. and is now an independent consultant. He has written four books and more than 60 articles and papers.

The slow stuttering of the LISP industry

HARVEY NEWQUIST

LISP is a hard word to say. Say it fast enough in sequence and you start lisping.

LISP is the language in which a large number of AI industry people always wrote their applications. LISP is great for graphics, expert systems, computer-aided design and simulations.

Then why are the machines that best run this language getting beaten by general-purpose computers from vendors such as Digital Equipment Corp. and Sun Microsystems, Inc.? The primary example: Lisp Machine, Inc. filed for protection under Chapter 11 of the U.S. Bankruptcy Code this month after soaking up $35 million of its investors' money since 1980.

LISP machines were first conjured up in MIT labs in the early 1970s. They were designed to run the programming language LISP, which was invented in 1956 by Professor John McCarthy, coiner of the term "artificial intelligence."

LISP, which stands for List Processing, is one of the two or three oldest languages in the computer world. It utilizes symbols instead of numeric representations to run programs.

There is a drawback. LISP uses an incredible number of parentheses to make its groupings, which earned it the moniker, "Lots of Inane, Stupid Parentheses." Also, all the associations, objects and symbols use up enough memory to bring an IBM 4300 to its knees. So LISP machines were created solely to run LISP code. With LISP machines, the world's research community had a device that could efficiently run expert systems, do rapid software prototyping and nifty graphics. But these machines weren't sold to the open market because there wasn't one — research and development people were the only users. Xerox Corp. had a chance to make the first commercial splash with a LISP machine, but its marketing staff couldn't figure out what to do with it. Perhaps the machines' names, Dandelion and Dandetiger, weren't much help.

In 1980, a group of researchers left MIT to form Symbolics, Inc. and manufacture and market dedicated LISP machines. Another MIT group left to form Lisp Machine, which was going to focus on multiuser LISP machines. Both companies faced an initial obstacle: No one in the commercial computing marketplace had ever heard of LISP, let alone needed a machine to run it. So Symbolics and Lisp Machine hit the market selling powerful machines that no one had a clue what to do with.

But sell they did. Symbolics must be given credit for creating an entire market. General Motors Corp., the U.S. Department of Defense, the National Aeronautics and Space Administration, Lawrence Livermore Labs

Continued on page 22

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

DCA members just want to have fun

JEFFRY BEELER

In their long, black robes and powdered wigs, the two judges look every bit the part of the stereotypical British jurist. Even the charges sound genuine: "The defendants stand accused of copyright infringement," the magistrate proclaims with mock gravity.

But wait a minute. What, pray tell, is that guy who calls himself the Devil's Advocate — the one prancing around in a red demon costume and brandishing a rubber pitchfork — doing in the middle of a judicial proceeding? What kind of court pillories its accused in chunks of Styrofoam fashioned in the shape of stocks?

And would someone please explain why dozens of spectators of this exercise in fractured justice are pelting the immobile defendants with corks?

Clearly, this is no ordinary trial. But then again, the aggrieved party in the case is no ordinary litigant. Whatever else it may be, no one could ever accuse the Digital Computer Association (DCA) of being just another professional society.

Conformity and solemnity

Virtually alone among trade organizations, the DCA embodies the spirit of rebellion against the stuffy conformity and tiresome solemnity that the computer industry's intense competition and technological ferment so often breed. Through its pranks and parodies, the DCA labors to preserve one of the computing field's most neglected and endangered aspects — its sense of fun.

Just how seriously the association takes the business of comedy was demonstrated in spades during its March annual meeting in Los Angeles. The main event featured a mock trial that would have sent Oliver Wendell Holmes into a state of catatonic shock.

Thrust into the reluctant role of defendant was the newly formed International Personhood of Iliterate [*sic*] Programmers (IPIP), an equally unconventional association that the DCA charged in absentia with the specious crime of copying its proprietary looniness.

Cherished traditions

Systems folk would have a difficult time finding another professional association that calls its presidents "Fish" or welcomes first-time visitors to its meetings with leis made of paper toilet-seat covers.

Nor do the members of most other trade organizations routinely disrupt their get-togethers by tossing corks at each other, a practice DCA members rank among their most cherished traditions.

Aside from its fondness for anarchy, the group's most distinguishing trait is its longevity. Believed to be among the industry's oldest societies of any kind, the association perpetrated its first act of unabashed facetiousness in 1952.

Even way back then, the DCA's founding fathers recognized the need to counter the computing field's tendency to take itself far too seriously. So, one score and 15 years ago, they brought forth in this industry a new association, conceived in levity and dedicated to the proposition that no cow is too sacred to milk for laughs.

In blending one part James Martin with 10 parts Steve Martin, the association has regularly and cheerfully demolished decorum, deftly skewered pomposity, disdained convention, satirized respected institutions and nurtured lunacy, according to ex-Fish Mary Rich.

Today, the association boasts a membership of approximately 100 computing specialists. A sampling of this fellowship includes Rich, who was the chair of last year's National Computer Conference; Linda Taylor, president of her own systems engineering and management firm; Robert Rector, vice-president of Conference and Meeting Assistance Corp.; and independent consultant Herb Grosch.

In their non-DCA capacities, most of the members are models of sober professionalism and respectability, although they would no doubt vehemently deny such a serious accusation.

Beeler is a *Computerworld* West Coast correspondent.

LISP industry

CONTINUED FROM PAGE 21

and even IBM are a few that saw the potential for specialized applications. By 1986, Symbolics had racked up sales of $114 million and installed more than 2,500 machines, ranging in cost from $50,000 to $125,000.

Symbolics was perceived to be the techonology leader. Lisp Machine found there wasn't as much of a demand for its machines as expected. It lost market share to Texas Instruments, Inc., which also happened to be one of its first investors. TI saw a market for LISP machines and figured it could afford to lose its $250,000 investment in Lisp Machine if it could gain sales at its expense. It did.

Then came the summer of 1986. A lot of users were concerned with the high price of LISP machines and started running applications on more economical delivery vehicles, like IBM Personal Computer ATs and Sun workstations. Sure, there was a performance differential, but the trade-off was worth it. Why buy a Symbolics 3600 when you could get three Sun computers for the same price? The AI consulting firm DM Data estimated that by the end of 1986, there were more than 6,000 LISP machines installed worldwide — more than a third of them from Symbolics. However, DM Data also estimated that there were probably fewer than 6,000 LISP programmers qualified to take full advantage of the machine. That means there are LISP machines sitting in companies with nothing to do.

By the end of 1986, specialized LISP machine sales ground to a screeching halt. Companies hadn't really stopped spending money for hardware to run AI applications, they were just spending it in new places, like at Sun and Apollo.

Symbolics was losing money going into 1987. Lisp Machine faced Chapter 11. Both companies moved to smaller offices. Symbolics, once thought invulnerable, laid off 17% of its work force. Lisp Machine worked out a deal with creditors.

In the meantime, both TI and Xerox shifted attention to LISP chips. TI announced its LISP chip twice — first in August 1986 to the AI community and then in February 1987 to the semiconductor community. Symbolics is now going after Sun and Apollo in their own markets. There are even newspaper ads that talk about the machine's versatility in multifunction environments and how the performance and price now make it a great general-purpose workstation.

The changing face of the market does not mean that no one is using LISP machines for LISP programming anymore. But the demand for specialized machines cannot grow as fast as it once did simply because there are not enough newly trained people to run them efficiently.

The lesson is a simple one, and one that has applied to all specialized machines since the idea of selling was invented: What happens when everyone who needs one, wants one or can afford one has one?

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...WHATEVER IT TAKES!

Fostering

CONTINUED FROM PAGE 21

received no shipment.

Murphy's Law suggests that troubles like these develop in any system unless someone looks out for the following:

- Data definitions: their nature and relationships and the control and promulgation of changes in them.
- File integrity: the timeliness, accuracy and consistency of data entry.
- File access: interfaces with other systems and controls of privacy and misuse.

A degree of specialized system knowledge is needed to perform these functions, both at the time of file creation and later, and end users aren't very interested in providing it. Inexperienced end users often feel that somehow their systems will work well without green-eyeshade-type discipline. Once convinced of the need, however, end users will often let central MIS provide related inputs to their system designs. (The last thing end users want to claim is green-eyeshade expertise.)

Maybe the answer is an artificial Bob Cratchit — a rule-based file access and control system that provides the necessary green-eyeshade functions in systems that are completely end user operated. Specialized versions of these have existed for years in dedicated on-line systems.

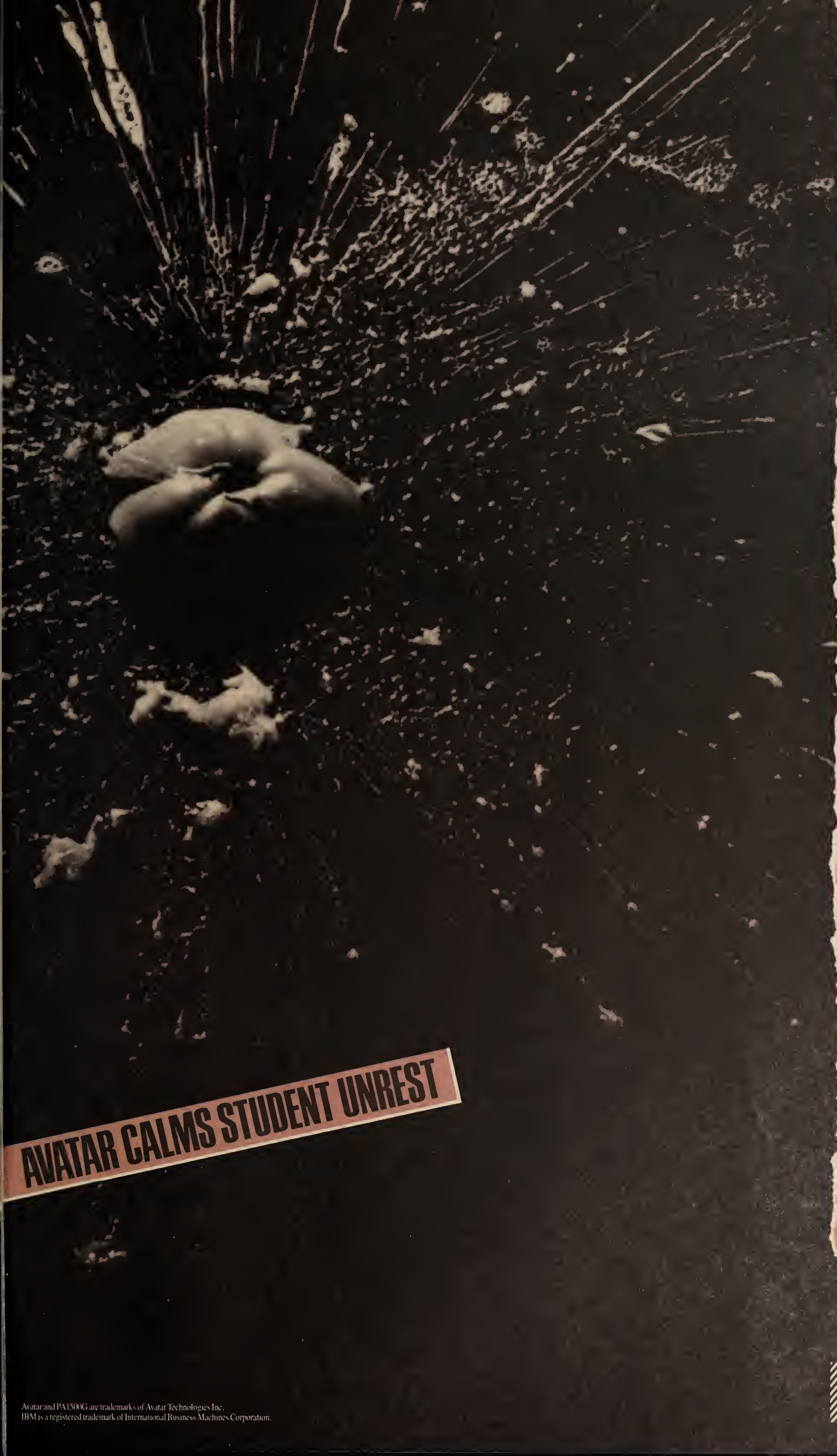
The most successful on-line systems usually have been designed cooperatively by end users and central MIS. Also, some of the fourth-generation application development systems force some green-eyeshade behavior on end users in a palatable way. Natural selection is likely to encourage these systems' evolution.

In any case, it's up to the corporate information systems — whether auditors, systems analysts or information resource managers — to make sure end users incorporate the necessary degree of green-eyeshade mentality in their systems.

That's not very difficult to do because the need is obvious (Scrooge continued to employ Cratchit), but end users tend to overlook the subject because it is unwelcome. If relationships are what they should be, end users will expose their systems ideas to MIS while they're still in the formative stage, and green-eyeshade issues can be addressed early.

They will do so for three reasons: 1) they know from training courses that controls are needed; 2) they trust central MIS to help, not hinder; and 3) the organization's IRM policies require them to.

How are relationships in your organization?



The students called it "a total lack of class."

They arrived at a major midwestern university on schedule, but their schedules didn't.

Which meant that the students who were ready to hit the books weren't happy. And the ones who were always late for class were even later.

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SOFTWARE & SERVICES

SOFT TALK

Richard Finkelstein

Judge SQL via standards

Now that Structured Query Language, better known as SQL, has emerged as the data base language standard, vendors are racing to introduce products that support or interface with SQL. In the mad dash, the term "SQL" is in danger of becoming as misused as "relational" and "4GL."

Fortunately, in this case, there are two standards available: IBM's and the American National Standards Institute's (ANSI). Although the standards differ in some ways, they are reasonably close and can serve as a means to verify the completeness of a vendor's SQL implementation.

SQL consists of a data manipulation language, a data definition language and a data control language. They can be executed directly or embedded in an application development language. Data manipulation language commands include SELECT, UPDATE and DELETE. All commands should have nested query capabilities, or subselects. Subselects allow the results of one query to be used within a higher level query.

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Vendors see VM market change

BY ROSEMARY HAMILTON
CW STAFF

Since the late 1970s, a number of small system-software vendors have made modest but steady incomes by providing utilities that plugged holes IBM left in its VM operating system. Now IBM is changing the rules on them.

As IBM continues to enhance VM while also positioning it as the key operating system for the 9370, the independent vendors have been forced to implement changes in both pricing and product strategies.

A number of these vendors say they will institute tiered pricing for their software products to coincide with the graduated pricing scheme introduced by IBM last fall.

The vendors have little choice, since users of low-end IBM 370 machines — namely the 9370 — will be paying less for the VM operating system and many associated IBM products than high-end users.

Little interest

Consequently, users will likely show little interest in products from independent vendors that carry an IBM 3090-class price for a low-end system.

VM Software, Inc. in Reston, Va., says plans are under way to implement a graduated pricing structure.

In addition, VM Systems Group, Inc. in Arlington, Va. — which implemented a three-tiered pricing plan last year — reports that it will soon announce a four-tiered plan to better reflect IBM's policy.

"I wouldn't say we were driven by IBM, but they certainly took the lead," comments Robert Cook, who is chairman of VM Software, in reference to the pricing changes.

Meanwhile, Adesse Corp. in Danbury, Conn., has held off announcing new prices, though it will likely do so, according to Tom Foth, vice-president of research and development.

Keeping price in line

"If a user spends $30,000 on a processor, we can't charge the same for software. System Resource Manager [a utility program for VM/SP that helps users allocate system resources] costs $60,000, almost twice the cost of the processor. How could we possibly charge that amount to 9370 users?" Foth asks.

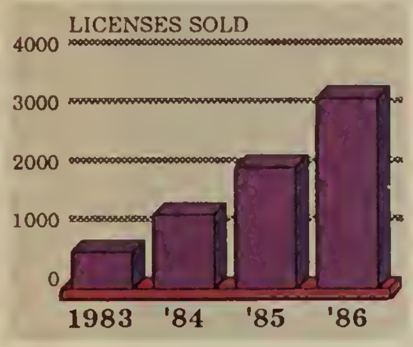
VM Software, for example, currently offers a line of utilities, such as VMSort, VMSecure and VMAccount, that sell for approximately $10,000 each. VMCenter, which is a package of 14 different utilities, sells at

Continued on page 27

Data View

Installed base grows for DEC's All-in-1

Acceptance of this package, which includes word processing, spreadsheet, calendar, electronic mail and desk manager, is helping sell VAXs.



CW CHART: SUSAN ALDAM

OA tool reflects work flow

Unix-based system emphasizes intergroup use

BY CHARLES BABCOCK
CW STAFF

OTTAWA — An office automation system that provides innovative document creation and retrieval features tied to electronic mail is available from Xios Systems Corp.

The firm, based here, spent five years studying office work patterns and developing a system that reflects a multilayered work flow. The result is an office system that can be tied to a number of common personal computer applications or exchange messages across a variety of hardware systems, said Brian E. Greenleaf, president of Xios.

Renaissance, as the office system is called, is a Unix-based system running on AT&T 3B, Unisys Corp. (Sperry Corp.) 5090, NCR Corp. Tower or Convergent Technologies, Inc. Mightyframe processors. At the Government Research Corp., a public-policy consulting firm in Washington, D.C., 30 users on Wyse Technology terminals are

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ADR links E-mail to Disoss

BY CHARLES BABCOCK
CW STAFF

PRINCETON, N.J. — An interface between an electronic-mail system and IBM's Distributed Office Support System (Disoss) was announced last week by Applied Data Research, Inc. (ADR).

Users of ADR/Email Release 3.0 and the optional interface can store and retrieve documents in a Disoss library, using keyword search and logic conditions. Outgoing or incoming correspondence is put in IBM's Document Content Architecture "final form," ensuring that transmitted information is presented correctly, spokesmen for the software firm said.

Release 3.0 also provides electronic-mail capabilities to the IBM Personal Services applications series, including versions that run on the System/36 and 38 mid-range processors.

ADR/Email users communicate with Disoss users as if the latter also were on the ADR/E-mail system. A message may be sent simply by keying in the re-

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Inside

- Risk analysis service aims to protect buyers. Page 28.
- Boole & Babbage updates IMF 2.3.0. Page 31.
- Jeyco Software rolls out VM/VSE performance tool. Page 32.

SOFTWARE NOTES

Data General adopts Ingres into its MV family

Data General Corp. will make the **Ingres** relational data base management system available on its MV family of 32-bit processors and DS/7500 engineering workstations under its AOS/VS operating system. Other Relational Technology, Inc. products will also become available on the MV family, DG spokesmen said.

The problem of extracting mainframe data for use in commercial expert systems is being addressed by a joint development program undertaken by **Unisys Corp.** and **Sterling Software, Inc.'s** Answer Systems Division. The project will seek to take the **Answer/DB** micro-to-mainframe link and develop a data extract and transfer capability for Unisys products that interface to IBM's IMS, VSAM and DB2 data base management systems.

In another move, the Answer Systems Division has signed a development agreement with **Wang Laboratories, Inc.** aimed at integrating Wang's Pace application development and relational data base product for VS processors with **Answer/DB**. Such a move would open up DB2, IMS and VSAM files on a mainframe to a VS minicomputer, Wang spokesmen said.

IBM has licensed **Micro Focus Cobol** for the IBM **Personal System/2**. Dubbed IBM Cobol/2, it is available immediately for use with IBM PC-DOS 3.2 and 3.3 and will support OS/2 when it becomes generally available. IBM Cobol/2 meets the ANSI Cobol '85 standard, Micro Focus Chairman Paul O'Grady said.

Dun & Bradstreet has invested an undisclosed amount with **Sales Technologies, Inc.**, an Atlanta-based developer and marketer of networked software for sales organizations.

Docuforum, a multiuser document creation and editing product from little-known **Network Technologies International, Inc.** of Ann Arbor, Mich., is being co-marketed by **AT&T.** The Unix-based package will be used in conjunction with AT&T's **Document Exchange**, announced recently for document translation and mail exchange across multivendor systems.

Digital Equipment Corp. has signed a cooperative marketing agreement with **Henco Software, Inc.** to co-market Henco's **Info-DB Plus** relational data base and text management system to the legal industry.

On-Line Software International, Inc. of Fort Lee, N.J., has formed a Toronto branch named On-Line Software Canada, Inc. The firm was in operation as the Mathematica Products Group Canada and marketed Martin Marietta Data Systems products. On-Line acquired the Ramis Information System, Ramis/PC Workstation and UKFO Productivity System from Martin Marietta.

Data Language Corp. of Billerica, Mass., has signed a joint marketing agreement with **Altos Computer Systems** and **Arete Systems Corp.**, Data Language spokesmen said. Altos manufactures supermicros, and Arete designs on-line commercial systems.

OA tool

CONTINUED FROM PAGE 25

connected to two Mightyframe processors, sharing documents and exchanging messages with each other and corporate offices, said Julie Romero, director of administration.

Although Renaissance can function as a stand-alone system that supports 25 to 35 users connected by twisted-pair wiring, system processors may also be tied together via Ethernet or other local-area networks, permitting intergroup communications, Greenleaf said.

Users praised the simplicity of Renaissance filing functions. The system maintains both individual and office or shared files, and users may retrieve files by searching for any number of fields used in the specific design of the document. For example, the user can search for a document on the basis of filename, subject, date or creator's name. If none of these options works, other searches can be conducted. The name of the last party to modify a document can lead a search or key phrases or parts of phrases that are known to be in the document, Greenleaf said.

Brian E. Greenleaf

"It's such a simple, simple system that you wonder what you did without it," said Romero, a Renaissance user since July 1986. "It's like falling off a log," added Jim Wolfe, a director of New Venture Development Corp. in Washington, D.C., and a Renaissance user for two months.

Users may create tickler files, seeking automatic reminders of action needed on particular documents on a designated date.

A file may be sent to another user by typing the name of the recipient along with the command SEND. Renaissance taps a directory of users to automatically route the message. Romero said documents sent to Toronto "shoot back down to Washington with executive comments in minutes."

The system can maintain distribution lists so that the user can send a message to a group without entering the name of each individual.

Documents to be transferred may include images and voice data as well as text.

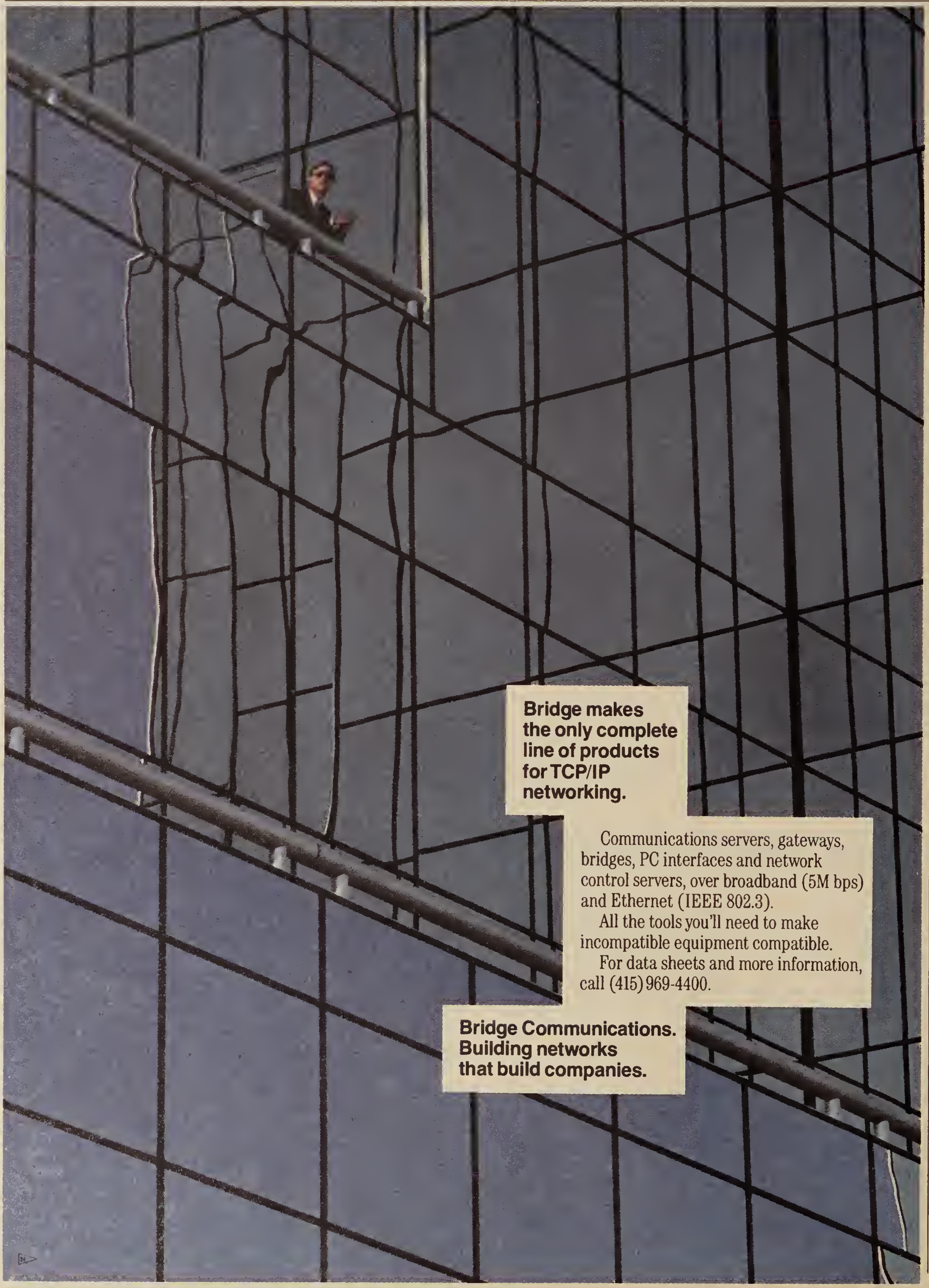
Renaissance has a background feature that automatically stores files every 15 seconds, minimizing data loss in case of system failure, Greenleaf said.

The system also has a simple word processor, termed a text editor. More sophisticated word processing needs are met on standard word processing workstations or IBM Personal Computer word processing packages, with files transferred into Renaissance.

Lacks spreadsheets

Users said the system does not offer spreadsheet capabilities but that files may be transferred into Renaissance from Lotus Development Corp.'s 1-2-3 and other packages based on Microsoft Corp.'s MS-DOS.

Renaissance was designed to connect to other systems by following such interconnect standards as the American National Standards Institute's x3.64; IBM's Systems Network Architecture, Document Content Architecture, Document Interchange Architecture and 3278 terminal emulation; and the International Standards Organization's communications protocols. Renaissance is sold as part of a turnkey, hardware-software system at a price of $2,500 to $3,000 per user, Greenleaf said.



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Tool tests MVS, VS1 application program output

GARDEN CITY, N.Y. — A testing tool has recently been upgraded and now has the ability to check output in files, records and fields after a program has been modified and to pinpoint mismatches in easy-to-read reports.

Release 1.1 of Computer Associates International, Inc.'s CA-Accucheck is designed to simpify the programmer-intensive task of testing and maintaining application programs in the IBM MVS and OS/VS1 environments, according to spokesmen for Computer Associates.

Release 1.1 also is said to contain the ability to "dump" records, printing either selected fields or full records in either character or hexadecimal format.

The tool can create test files and process VSAM and Indexed Sequential Access Method files, according to the vendor.

These features are said to reduce the number of test runs needed.

Release 1.1's ability to test an entire job stream and pinpoint exceptions speeds the removal of bugs from applications, Computer Associates spokesmen said.

The $8,000 product is also marketed as part of CA-Convertor, a VSE-to-MVS conversion system.

Computer Associates, which is headquartered in Garden City, markets more than 70 system software products for the major IBM operating system environments.

Vendors see

CONTINUED FROM PAGE 25

a price of $45,000.

Cook says he expects to "chop the price of the packaged product" and eventually discontinue selling its individual components.

In addition to pricing changes, the vendors are etching out new strategies to better compete in the changing market. Two major changes are under way. First, with each enhanced version of its VM operating system, IBM fills in more holes that had represented pieces of the independents' business. Second, by positioning VM as the primary operating system for the 9370, IBM has opened a new market for the independents.

So while the first change could lessen market opportunities, the second could make up for the loss. Not surprisingly, then, most of the independents have already announced plans for 9370 products.

In general, these plans remain sketchy. VM Systems Group, for instance, says it will announce two products by the end of the year to "meet the needs of 9370 people."

Sweeping changes

Among this group of vendors, VM Software seems to be making the most sweeping changes to its strategy. The vendor has been marketing a long lineup of utilities while also marketing an integrated collection of those tools as VMCenter.

In addition to cutting prices of VMCenter and discontinuing components, VM Software will introduce VMCenter II later this year, which will eventually supplant the original VMCenter package, according to Cook. The vendor says the new version will be geared toward departmental users. As a result, what will eventually be the company's flagship product will be aimed primarily at a new group of users. "VMCenter II will be targeted up and down the [370] line but to the 9370 in particular," Cook says.

Finally, the vendor also recently created a division to market relational data base tools. However, Cook says this diversification is "not because the systems software market is getting weak but because this new one is about to grow a lot."

Other vendors say they will be tailoring existing products to 9370 users while also maintaining their existing customer bases. "We've got a bunch of products in the pipeline for 9370 users, but we'll still develop and enhance products that are technically sophisticated," Adesse's Foth says. "We'll be going at it from both ends," he adds.

The VM independents launched their industry in the late 1970s. Since the advent of VM in the early 1970s, users have been requesting additional features from IBM and have complained of minimal response.

A group of small suppliers, joined by a few mainframe software houses — such as Computer Associates International, Inc. in Garden City, N.Y. — stepped in to offer tools that increased the functionality of VM.

Since then, the VM market has grown to $85 million in revenue in 1985 and is expected to reach $100 million this year, according to International Data Corp. (IDC), a market research firm in Framingham, Mass. Among the firms that exclusively market VM utilities, the largest is publicly held VM Software, which recorded $18 million in revenue last year, according to IDC.

In the last two years, IBM has paid more attention to its VM operating system. With each VM release, such as the introduction of VM/SP Release 5 in October 1986, IBM satisfies more user requirements and lessens the opportunities for the independent software companies, market research analysts say.

However, "There are always going to be holes that IBM won't be able to fill, so the independents can continue to prosper," says Clare Fleig, an analyst with the International Technology Group in Los Altos, Calif.

"What is changing is the windows for the independents to fill are getting smaller," says Romney White, president of VM/CMS Unlimited in Dorchester, Mass. But "IBM can't make up in a release or two the neglect of 10 years," he continues.

IBM's increasing support of VM "hasn't had a negative effect so far," says Constance Mays, vice-president of marketing for VM Systems Group.

"We've tried to position our products in such places where IBM doesn't address user needs. And we hope that they don't step on us," Mays remarks.

These systems software vendors are also likely to face increasing competition from the larger software houses like Computer Associates, although analysts do not expect that to have a major impact.

"Utilities are significant because VM requires a lot of components to work well. But I don't see the big software companies making a mad dash to provide lots of new programs," International Technology Group's Fleig states.

> WITH EACH enhanced version of its VM operating system, IBM fills in more holes that represented pieces of the independents' business.

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Single System Image (SSI) from VM/CMS	VM Inter-System Facilities (ISF) from IBM
You can use any processors in Group 10, 20, 30, or 40 in an SSI complex.	IBM's ISF does not support Group 10 and 20 processors. In Group 30, ISF only supports 4381's with 16 megabytes or more, and 3083's. In Group 40, ISF does not support the 3081 D16 processor.
You can use IUCV and VMCF to communicate between programs across processor boundaries in an SSI complex.	With IBM's ISF, you can't use IUCV and VMCF across processor boundaries.
An SSI complex supports up to 33 processors.	IBM's ISF is limited to two CPUs.
SSI dynamically switches virtual machines from one processor to another to satisfy user requirements. This means a user's terminal and virtual machine can be on different CPUs. As a result, duplicate software licensing and maintenance charges can be reduced or eliminated.	IBM's ISF offers no switching capability.
You can use any version of VM/SP or VM/HPO in an SSI complex.	IBM's ISF requires that you use HPO 4.2.
SSI balances the user load automatically.	IBM's ISF doesn't do load balancing.
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SSI doesn't require extended storage support.	IBM's ISF does.
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Risk analysis service aims to protect buyers

Data Securities, DEC model claimed safeguard against third-party bankruptcies

BY NINAMARY BUBA MAGINNIS
CW STAFF

SAN FRANCISCO — Data Securities International, Inc. recently announced a business risk analysis consulting service for software buyers who want to protect their application investments.

Data Securities developed its risk analysis model with assistance from Maynard, Mass.-based Digital Equipment Corp. The hardware vendor plans to employ the model when purchasing software for internal use, according to James Chiafery, DEC's controller for corporate software and consultant acquisition.

The risk analysis is based on a mathematical model that incorporates aspects of bankruptcy, lending and credit analysis formulas, Chiafery said. The formula can reportedly determine whether a specific third-party application requires escrow protection.

"Basically, we're protecting company interests when dealing with third-party software vendors," Chiafery observed. "The computer industry, as you know, is made up of several smaller firms that go in and out of business on a regular basis," he added.

There are approximately 5,000 to 7,000 software vendors of reasonable size, Chiafery explained. DEC buys applications from more than 10% of these suppliers for internal use, he said.

By placing a software application in escrow, DEC can have access to code and therefore be able to perform maintenance if a software firm is unable to. "What we're really looking for is protection against a software firm's inability to support the product," Chiafery noted. "You can easily say 'escrow everything,' and then you wouldn't need a risk analysis. That can be expensive and cumbersome to administer. It saves money to analyze which packages and companies make sense to escrow."

Risk analysis Q&A

DEC's version of the risk analysis model reads like a workbook, Chiafery said. The user answers a series of questions and calculates a score. "We wouldn't put a copy of Lotus in escrow because we think that will be around for a while. The model really helps us define under what circumstances it would make sense to escrow the software," he said.

Data Securities' version of the risk analysis model is based on a four-part methodology. The first part assesses how dependent a user is on the application technology.

The second phase estimates whether the software vendor can continue to deliver adequate support throughout the application's life cycle.

The third section quantifies the loss incurred by the user if the software supplier fails to provide required support. The last section compares estimated risk with the cost of protecting the technology under escrow services.

While the mathematical model is performed manually, it can be automated and incorporated in a spreadsheet, Data Securities claimed.

ADR links

CONTINUED FROM PAGE 25

cipient's name, ADR spokesmen said.

A personal computer file-transfer facility has been included in Email that allows users to transfer data between a PC and an ADR/Email file folder, moving ASCII or binary files.

ADR/Email Release 3.0 is available immediately at a price of $21,500 for the IBM VSE operating system and $35,000 for the IBM MVS. The Disoss interface is priced at $2,500 for both operating systems and requires Disoss Version 3.2 or later. The PC file-transfer facility costs $5,000 for 100 copies, spokesmen said.

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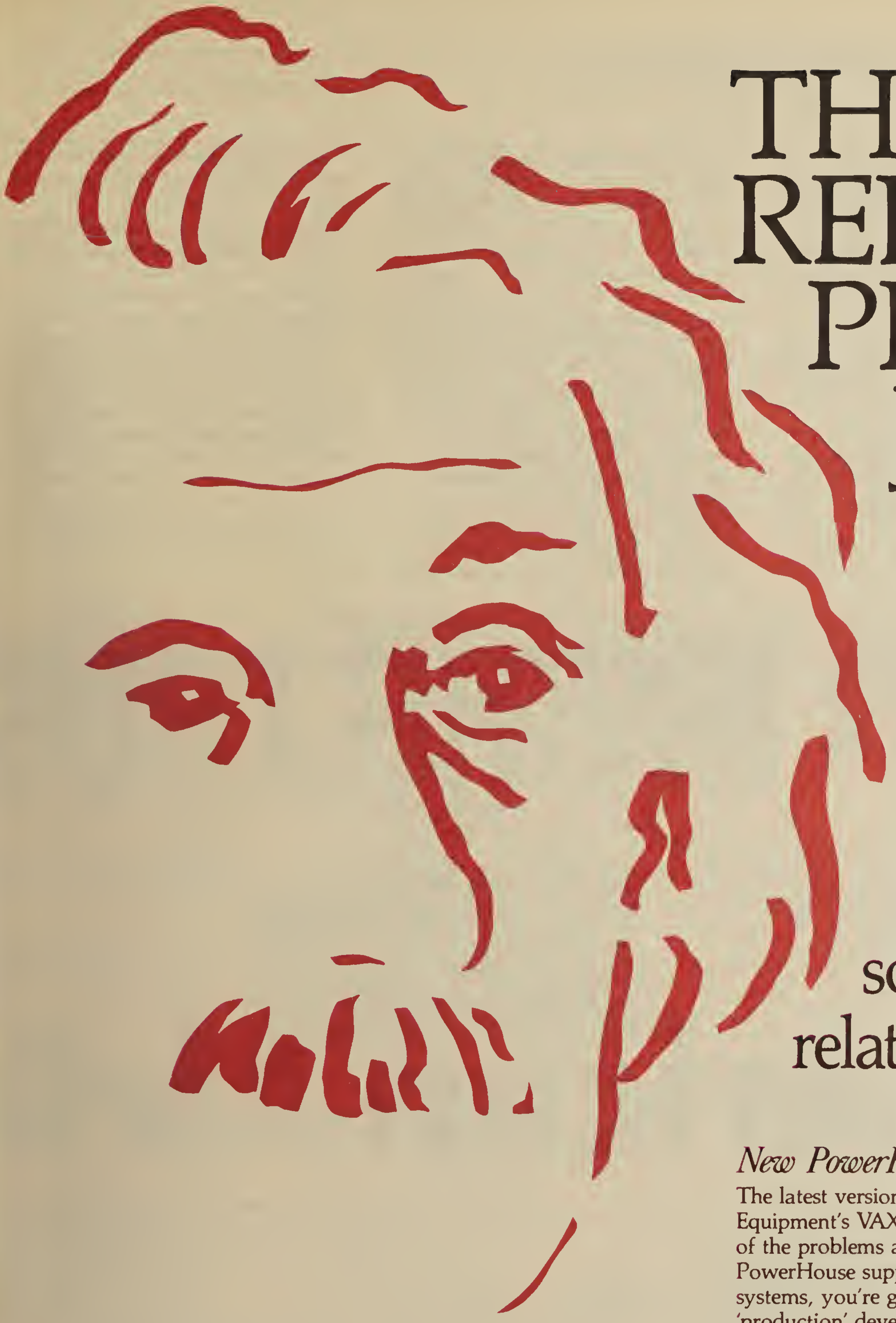

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Development power for 'production' applications

PowerHouse gives you total development capability in one language, and not a collection of weak DBMS utilities and interfaces. Regardless of which database you're using, PowerHouse gives you advanced, dictionary-driven development power to prototype and build 'production' commercial applications.

And Cognos has a full-service organization to back you up. For more information, call toll-free, **1-800-4-COGNOS**. In Canada, call 1-613-738-1440. In the U.K., call +44 344 486668. Or call on any of our 40 Cognos offices around the world and find out why 7,000 customer sites use PowerHouse.

COGNOS

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Judge SQL

CONTINUED FROM PAGE 25

An extension of the subselect is the correlated subselect that relates a field in a nested query to the higher level query.

The SQL data manipulation language also should include standard predicates such as BETWEEN, LIKE, IN and EXISTS. The SELECT command also contains the ORDER BY, GROUP BY and HAVING clauses. The ability to do a UNION is essential. Of these predicates and commands, the EXISTS and UNION, along with the nested query capabilities, are the features most often found missing from vendor implementations.

Built-in functions that are common to both IBM and ANSI are AVG, MAX, MIN, SUM, COUNT and DISTINCT. The math functions are executable within the WHERE and HAVING clauses. Null values, or the ability to represent absent data, is an important aspect of SQL. SQL implementations vary greatly in their treatment of nulls, since there is no clear standard.

IBM's data definition language includes commands to create and delete objects such as tables and table spaces. At present, ANSI does not address creation of indexes or spaces, nor does it contain any command to delete an object from the system. The lack of a CREATE INDEX command or any DROP command is a major flaw in the ANSI standard.

Data types also differ in the two standards, and ANSI includes a CREATE SCHEMA statement. UNIQUE and PRIMARY KEY constraints are defined in the ANSI CREATE TABLE command, whereas IBM implements the same feature with a Unique Index and a Not Null column specification. IBM addresses physical space allocation in its CREATE DATABASE, CREATE TABLESPACE and CREATE STOGROUP commands. None of these commands are included in ANSI and are usually not found in other SQL implementations.

Views are another integral part of SQL's data definition language and should be defined using standard SQL SELECT statements.

The data control language includes the ability to grant and revoke user authority. Security can be established directly on objects such as tables or, for finer control, on views.

Two other components that are important to any SQL system are the system catalog and optimizer. ANSI provides no direction on the system catalog, so vendors either avoid implementing it or use IBM's catalog structure as a guide. The lack of a catalog definition is probably the most serious problem with ANSI's definition. It is here that vendors differ most. This is unfortunate, since the system catalog is an integral part of any future attempt to connect SQL data bases.

The optimizer, as already mentioned, should also be considered mandatory in any SQL system. The optimizer automatically selects the most efficient manner of retrieving data. The SQL language does not require the user to predefine any access paths. In fact, SQL does not even allow direct references to an index. It is through the optimizer and views that SQL provides logical data independence between application programs and physical data structures.

A product that fully implements SQL with an integrated catalog satisfies seven of the 12 rules constructed by Edgar Codd for relational data bases. SQL, therefore, can be used as a measuring rod for fidelity to the relational model. Of course, SQL will be expanded so that it will eventually satisfy all of Codd's rules. In the meantime, an organization purchasing relational data bases should look to a full SQL implementation as the best insurance for its long-term investment.

Finkelstein is vice-president of Midwest operations in Chicago for the Codd and Date Consulting Group.

IBM offers enhanced VM batch facility

BY ROSEMARY HAMILTON
CW STAFF

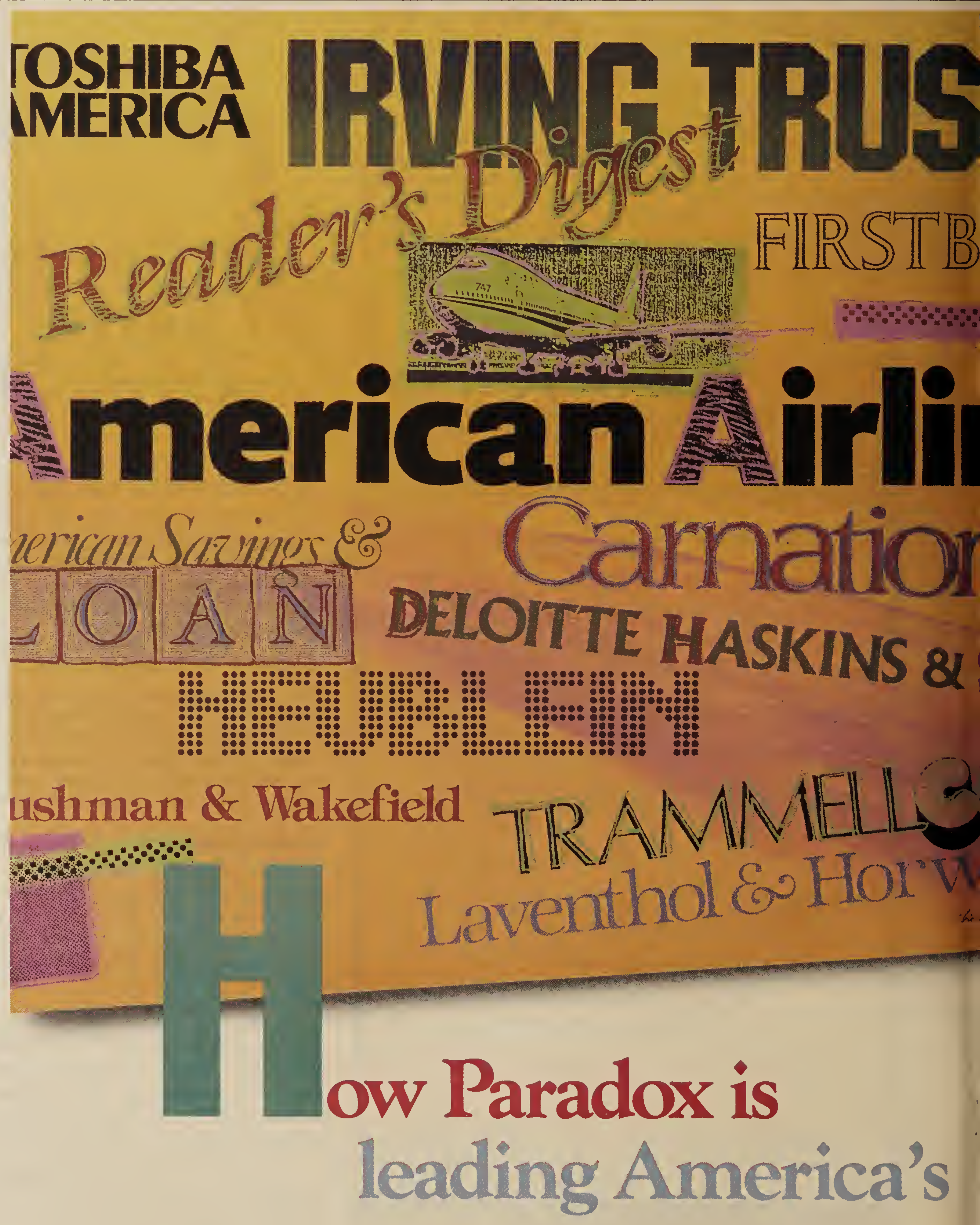
RYE BROOK, N.Y. — IBM introduced a batch processing facility for its VM operating system recently that will replace a less sophisticated batch facility that has been on the market for five years.

The software was designed to allow users in the interactive VM environment to concurrently run batch jobs. With VM Batch Facility, users can schedule, submit, execute and cancel jobs. It is also said to allow them to monitor jobs in progress.

With the addition of many features, VM Batch Facility reportedly provides users with more flexibility than its predecessor, VM Batch Subsystem.

IBM said it will stop marketing the VM Batch Subsystem, which was originally written for Intel Corp., in June.

VM Batch Facility is currently available and can be used with VM/SP Release 3 or later and VM/XA SF Release 1 or 2. It can also run under the high-performance-option version of VM/SP Release 3 or later. The software ranges in price from a one-time license charge of $1,800 for low-end IBM 370 processors to $7,200 for high-end 370s.



How Paradox is leading America's

NEW PRODUCTS

Systems software

Boole & Babbage, Inc. has announced **IMF 2.3.0**, an updated version of its integrated family of products for the management of IBM/VS DB/DC systems.

The new release is said to offer tools for performance and operations management as well as IMS/VS system reporting and accounting. Enhancements have been made to the reliability, availability and serviceability and the IMF System Manager, the vendor said. Features include a time-initiated Exec facility.

IMF products are priced from $12,500 to $35,000.

Boole & Babbage, 512 Oakmead Pkwy., Sunnyvale, Calif. 94086.

BBN Software Products Corp. has announced a version of its **Quality Control Analysis** (QCA) software for IBM's 9370, 4300 and 3090 series mainframe computers and plug compatibles under the VM operating system.

QCA software is a product option to RS/1, the core of the vendor's RS series of data management and analysis software. It is an interactive data analysis and graphics tool said to provide a range of quality control and manufacturing application functions, including control charts, inspection sampling plans, custom charts, process capability studies and trend analysis.

The QCA product for IBM mainframes is priced at $10,000.

BBN Software Products, 10 Fawcett St., Cambridge, Mass. 02238.

SAS Institute, Inc. has announced **Version 5** of the **SAS System** for Data General Corp.'s Eclipse MV series under AOS/VS.

Version 5 is said to offer five additional products as well as enhancements to base SAS and SAS/Graph software. Additional products include SAS/AF software for building menu-based front ends; SAS/FSP for letter writing, spreadsheets and interactive forms-oriented data entry, editing and query; SAS/ETS for financial planning, forecasting and modeling; SAS/OR for project management; and SAS/IML for interactive matrix programming.

First-year corporate license fees range from $1,000 to $8,000 for each of the software products.

SAS Institute, Box 8000, SAS Circle, Cary, N.C. 27511.

CPT Corp. has announced **Revision 5.0** software for the **Office Dialog System** family of integrated office solutions.

Revision 5.0 features a Data Import and Custom Menu Utility for importing binary files and third-party applications, a productivity tool designed to speed day-to-day tasks and Datagrams, an electronic-mail facility. Other features include a document-oriented formatter for central printing on laser printers and an expanded facility for optical character recognition input.

Enhancements have also been made to the wide-area networking and total text search functions as well as to the Office Dialog System relational data base management system, spreadsheet, programming languages and resource management tools.

Prices start at $2,400.

CPT, P.O. Box 2958, 100 Mitchell Road, Minneapolis, Minn. 55440.

Saddlebrook Corp. has introduced the **Advanced System**, an integrated information processing system for financial services institutions.

Advanced System is said to incorporate an integrated data base and Saddlebrook's Client Controllable software architecture on Digital Equipment Corp. VAX computers. Capabilities include deposit processing, loan servicing and electronic funds transfer as well as the ability to cross-reference accounts in the same household.

Report writing functions allow users to select, sort and total information about accounts, customers and transactions.

Advanced System, including hardware, software and implementation, is priced from $1.25 million to $3 million.

Saddlebrook, 101 Main St., Cambridge, Mass. 02142.

Applications packages

Deneb Systems, Inc. has ported its **Deneb Construction Accounting & Estimating System** to the NCR Corp. Tower series under AT&T's Unix System V, Release 3 operating system.

Writen in Cobol, Version 3.0 of the Deneb System includes applications for payroll, job cost, purchase orders, accounts payable, accounts receivable with inventory, general ledger, bank reconciliation, item billing, equipment control, estimating and order entry. Version 3.0 also provides a multiuser function.

The Deneb System is priced at $1,295 per application.

Deneb, Suite 2C, 201 Riverside Drive, Dayton, Ohio 45405.

Expertware, Inc. has announced **Release B** of both its **Configuration Management Toolkit** (CMT) and its **Documentation Support Toolkit** (DST) products.

The enhanced versions allow users to incorporate information from forms produced by the DST into configuration man-

Continued on page 32

Paradox is taking over the database standard at hundreds of top companies by making it easier to get more done.

Today more and more top companies are shifting their database standard. After evaluating dBASE® and R:BASE® and every-other-base, they're reaching one conclusion—a powerful relational database called Paradox®.

"It has set the standard for the future," says Greg Salcedo of California's American Savings & Loan. "Out of the databases I've used, Paradox is easily the best," reports Juliet Hubbell of Toshiba America. "Paradox occupies an important niche dBASE couldn't fill," concludes Fred Parlato of Georgia Power.

Friendly Acquisition

Hundreds of companies agree: Paradox is easier to learn, easier to use, and more powerful.

"We compared Paradox, dBASE and R:BASE side by side. Paradox made it easier to do more," says Marty Hathaway at American Airlines.

By working with our familiar Lotus®-like interface and intuitive "query by example," users easily analyze data in ways previously beyond their capabilities. "With Paradox we're getting information that was just too difficult to reach before," explains Gerard Nussbaum of accounting firm Deloitte, Haskins & Sells.

Capital Gains

Paradox is faster than dBASE across the board, sorting records at twice the speed. "The only thing you give up when you leave dBASE is frustration," notes Salcedo.

Paradox Application Language (PAL) helps programmers build rich applications in less time, cutting development costs by up to two-thirds.

Everything considered, it's no wonder that at Trammell Crow, eight departments independently decided to make it their standard.

Mega Trend

This grass roots support is sweeping companies everywhere. Paradox is taking over the database standard at Brown & Williamson, Sperry & Hutchinson, Litton Guidance and Control, and hundreds more. Observes software developer Burt Alcantara: "Paradox is clearly the standard for speed, performance and ease of use. Widespread acceptance is making it the industry standard as well."

To make it yours, call 1-800-447-4700, Department 202 for information and the Ansa dealer nearest you, who can give you a free Paradox Preview demonstration diskette. In the U.K., call 01-580-4766.

PARADOX by Ansa

largest takeover

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Continued from page 31

agement reports. Incorporated in CMT Release B is a verification tool that enables the configuration manager to ensure the integrity of a configuration's data base and to verify that the common components of the configuration are properly linked.

Both products run on computers ranging from the Digital Equipment Corp. VAX/VMS systems to the IBM Personal Computer AT. Prices start at $12,000 for CMT and $10,000 for DST.

Expertware, Suite 220, 3235 Kifer Road, Santa Clara, Calif. 95051.

Manufacturing Decision Support Systems, Inc. has added the **Estimating and Quoting** module to its MDSS on-line system designed to support manufacturing decisions.

The module is said to allow users to control a company's pricing policies for existing products as well as to determine costs and pricing strategies for products in the development stage. Quotes can be generated from estimates, other quotes or directly from standard product definitions. Features include transfer functions, "what-if" capabilities, a generic formula file and unlimited comments at any level.

MDSS runs on the Hewlett-Packard Co. 3000 series. The Estimating and Quoting module costs from $5,600 to $14,000.

Manufacturing Decision Support Systems, 1717 E. 9th St., Cleveland, Ohio 44114.

Access Technology, Inc. has announced **Release 2** of its **20/20** integrated spreadsheet for Data General Corp.'s MV series computers.

Release 2 is said to provide greater compatibility with Lotus Development Corp.'s 1-2-3. Enhancements include optional letter and number cell notation, advanced macro capabilities including worksheet-based macros and new range commands.

20/20 Release 2 is priced from $2,800 to $9,800.

Access Technology, 6 Pleasant St., S. Natick, Mass. 01760.

Languages

Analytic Sciences Corp. has introduced a version of its **Fastbol** Cobol maintenance software tool.

The new release is said to improve processing efficiency and add the capability of automatically merging copy code into the Cobol program being analyzed. Fastbol also provides a facility for removing the expand copy code that has been added for analysis purposes but has not been modified.

Fastbol runs on IBM mainframes with VM or MVS operating systems. Fastbol with copy-code expansion costs $25,000.

Analytic Sciences, 55 Walkers Brook Drive, Reading, Mass. 01867.

Utilities

Jeyco Software has introduced **Softkey**, a VM/VSE performance product.

Softkey is said to allow the full system integrity provided by lockfile to be accessed at processor speed, eliminating the bottleneck of disk access.

Softkey is priced at $4,000 for systems below 3.0 million instructions per second (MIPS) and $6,000 for systems at 3.0 MIPS or above.

Jeyco Software, P.O. Box 5966, Lincoln, Neb. 68505.

Duquesne Systems, Inc. has announced **DASDMON Release 1.5**.

Release 1.5 reportedly features expanded cache-use measurements, said to allow a user to determine the efficiency of cache controllers. Users can view complete cache-hit statistics and read/write ratios for individual jobs and data sets. Release 1.5 also contains a data set placement manager component that identifies problems on specific volumes and paths.

The real-time tool automatically measures the performance on MVS and MVS/XA systems and analyzes problems.

DASDMON costs $12,500.

Duquesne Systems. Two Allegheny Center, Pittsburgh, Pa. 15212.

Isomorphic Systems, Inc. has enhanced its **Iso Form** software utility said to provide data extraction, data movement, data restructuring and data formatting.

Iso Form now includes new IMS and DB2 interfaces. It uses standard file definitions found in cataloged Cobol or PL/I file descriptions, IBM DBDs or PCBs, DB2 tables or Views or other standard file definitions. It permits selection or conditional retrieval based on logical screening. Iso Form is priced at $35,000.

Isomorphic Systems, 1103 Westgate, Oak Park, Ill. 60301.

Development tools

Diversified Software Systems, Inc. has announced **Release 5.0** of its **Docu/Text** automated documentation system for IBM and compatible systems running OS/VS1 or MVS.

Docu/Text is said to extract and analyze data from existing sources, such as IBM Job Control Language libraries, and present data in a useful format.

Release 5.0 features an on-line query facility for the Operations Documentation and on-line support through IBM's Interactive System Productivity Facility.

Docu/Text costs from $9,500 to $50,000.

Diversified Software Systems, 996 Minnesota Ave., San Jose, Calif. 95125.

IS YOUR COMMUNICATIONS NETWORK A MONUMENT TO THE PAST?

Times have changed. Faced with budget cuts, skyrocketing phone bills, and increasingly complex information needs, state and local governments are abandoning the antiquated solutions of the past and striking out on their own ... with integrated voice and data communications systems from Harris. Now you can own instead of lease. And pocket the difference!

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The result is communications independence . . . from higher costs . . . and from the inflexibility of existing systems. So when it's time to take your communications system off the list of historic trusts, call Harris, TOLL FREE, 1-800-4-Harris, ext. 2110.

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MICROCOMPUTING

SMALL TALK

William Zachmann

Zooming in on modems

Anyone who doesn't believe that lower cost compatible products can offer first-class value and reliability hasn't had any experience with modems from Boston-based Zoom Telephonics, Inc. The company's Zoom/Modems for IBM Personal Computers and compatibles, which are Hayes Microcomputer Products, Inc. compatible, are as good as any I have seen and tested.

Zoom Telephonics offers both 1,200 and 2,400 bit/sec. modems in two models. The ST models, in addition to all the basic Hayes compatibility features, include a "Demon Dialing" facility to keep trying a busy number until it is answered.

Other features include audio input and output jacks as well as an ability to work as COM 1, 2, 3, or 4. Built with the high-speed 16450 universal asynchronous receiver transmitter, they are able to work with 8-, 10- and 12-MHz PC AT-compatible systems as well as with Intel Corp. 80386-based systems.

Besides the standard features of the ST models, the XL models include a clock/calendar

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Apple's goal: Meet MIS head-on

This is the first of a two-part series.

It has been an exciting first quarter for Cupertino, Calif.-based Apple Computer, Inc., which has showcased a formidable array of products at three Apple-oriented conferences in the last two months. Among the products unveiled were the Appleshare file server, the Appletalk PC Card, the Open Mac and the Unix Mac — pieces that Apple hopes will each contribute to the firm's success in the business market. Despite these achievements, Apple still faces some resistance from large corporations where IBM is the rule, and the failure of the "Macintosh office" has not been forgotten. Apple is well aware of these obstacles, but does not consider them insurmountable.

Charles Berger, Apple's vice-president of business development, recently spoke with *Computerworld* Senior Editor Patricia Keefe regarding his company's MIS strategy.

How important are MIS and Fortune 1,000 companies to Apple?
We think they are very important. Although we've spent more time working with individuals within large companies, we've [also] spent an awful lot of time dealing with the MIS departments, demonstrating to them three things that they were concerned about with Apple, and to some extent, still are.

The first is that we have products we think offer significant advantages over other PCs available to them. The second is that we can provide, and are providing, connections into the environments that they have created within their companies, whatever they happen to be — the networks, communications and systems environments. And third, we are capable, as an organization and through our resellers, of providing them with the support, service, training and sales efforts that they need.

What is Apple's share of the Fortune 1,000 market?
We don't have a good estimate. I think *Business Week* said something on the order of 7%. If we were in the 10% to 20% range within a year's progress, that would be good.

How badly did the failure of the Macintosh office hurt Apple in the business market?
I think the Macintosh office was probably an idea a little bit ahead of its time. It showed a little bit of our naivete in terms of what it took to develop communications products. I think it set us back only in that it hurt our credibility. It didn't help me in the past year where we were promising open architecture machines, file servers and other connectivity. Some [users] said, "Yeah, just like the Macintosh office."

You're saying that you ran into some skepticism?
Oh, absolutely. Now that we have all the products here, the credibility gap that was created has certainly been narrowed.

Yes, but how much of that resistance remains?
I would say [that resistance] has substantially lessened over the past year and a half, even before the introduction of the new products. We've been able to prove in one specific area, desktop publishing, that we have a clearly superior solution. We've also been able to prove that . . . in general productivity areas, we are as

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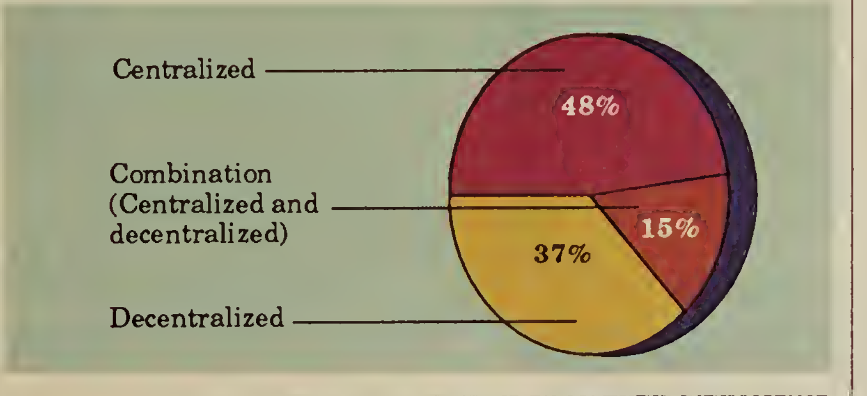
Inside

- Brother unveils software driver for Macintosh users. Page 34.
- Re:Source interface simplifies use of on-line services for PC users. Page 41.
- New Media Graphics announces graphics-overlay board for IBM PCs. Page 42.

Data View

MIS structures
Fortune-ranked industrial companies



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART: SUSAN ALDAM

Benchmarks probe Basic

This is the final installment of a four-part series on Basic products for IBM Personal Computers and compatibles.

BY T. A. ELKINS
SPECIAL TO CW

Benchmarks are one of several tools that give a prospective user insight into an otherwise unknown product. Programming languages can reasonably make use of a fairly intimidating number of such tests, and a number of benchmarks have been run on the various Basic systems examined. One area that has not commonly been given sufficient attention is floating-point and transcendental speed and accuracy.

Floating-point calculations are relatively common computer tasks and rank among the slowest performed, while calculating such transcendental functions as common logarithms probes deep into the ability and refinement of a programming system. Systems with good marks here have a

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Users want software management improvements

Survey finds corporate buyers unhappy with upgrades, bugs, copy protection

BY PEGGY WATT
CW STAFF

The fact that user gripes about upgrade hassles, bugs and copy protection headed the list of a recent user-complaints survey came as no surprise to software publishers. But airing those complaints can only encourage compromise, according to representatives of both user and vendor associations.

In a draft survey on corporate buying concerns by members of the New York-based Microcomputer Managers Association, the sometimes colossal nuisance of managing upgrades and vendors' reluctance to acknowledge bugs were named as users' biggest gripes. Disdain for copy protection and the desire for site licenses to make management easier were also mentioned frequently. The survey covered the 350 members of the association, who represent more than 200 corporations located mainly in the greater Manhattan area.

Members were asked to comment on the draft results and mention any other key concerns to be included in the final draft, which may be released at Comdex/Spring '87 in June, said Alex Kask, president of the Microcomputer Managers Association and senior manager at Ernst & Whinney in New York.

The biggest complaints were of common methods of handling upgrades. The survey estimated it could take from 17 to 32 weeks and 450 man-hours to update 100 copies. The process includes evaluation, budgeting, orders, installation and training, in addition to collecting the old versions.

"In the real world, the process can take a year to complete," and users often do not need or use the new capabilities, the survey said. A new version may even be announced before the upgrade is completed. Yet if the vendor discontinues the earlier version, the corporation is forced to upgrade anyway, Kask said.

While users do not want an upgrade for every bug, they say they at least want to be informed of them. "Only users can accurately determine the impact of the bug on their work," one draft comment said.

Copy protection remains a continuing complaint, Kask said. "Copy protection will be an issue as long as one major company still has it," he added.

Most users' concerns were not new to vendors, but many can be resolved as marketing issues, said Kenneth Wasch, executive director of the Software Publishers Association (SPA), who took an early look at the survey. Removal of copy protection is regarded as a positive selling point, for example.

While the survey suggested that copying documentation be allowed, Wasch cautioned that allowing such copying invites illicit distribution. "When there's no copy protection, the one minor impediment is limited copies of the documentation," Wasch said. "Not every organization is concerned or successful at stopping unauthorized copying. Yet it's also not fair to penalize those

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Zooming in

CONTINUED FROM PAGE 33

with battery backup, Touch-Tone password security for incoming calls and a Touch-Tone decoder. The latter, when used in combination with the audio input jacks, can be used with voice-generation equipment to create a dial-in audio-response system.

Another feature of the XL models is an 8K-byte random-access memory buffer that can be used to receive messages or small files in the background while the user is doing other work on the system. The buffer can be expanded to 32K bytes.

All this is on top of a basic modem that provides very reliable communications with remarkably low error rates. The Zoom modems appear to work on phone lines that give other products noise-interference problems.

And if that isn't enough, they also come with a two-year warranty. At list prices of $349 for the top-of-the-line Zoom/Modem PC 2400 XL ($319 for the ST model) and $219 for the 1200 XL ($199 for the 1200 ST), the systems add up to a terrific value.

The inclusion of the unique Demon Dialing feature is no accident. It was frustration stemming from problems getting through to a telephone number for tennis court reservations at MIT that led Frank Manning and Bruce Kramer to invent and build the first Demon Dialer in 1975.

Manning and Kramer, along with T. Pat Manning and Peter Kramer, founded Zoom Telephonics one year later with the intention of eventually selling a Demon Dialer for regular voice telephones. After starting with a simpler product — The Silencer — that was just a switch to turn off the ringer on a telephone, they finally introduced the Demon Dialer in 1981. Their first modem product was a 300 bit/sec. model for the Apple Computer, Inc. Apple II.

Zoom's considerable experience with telephone system tone-detection and response prior to getting into the IBM and compatible modem business early last year has paid off. The technical abilities of its modems have proven, under test, to be significantly better than those of its competitors.

A well-written and quite comprehensive manual makes installation a snap. There are four jumpers and one three-position DIP switch on the card that can be set for various special options.

The Zoom/Disk software that comes with the modems supports the modems' special features, is well documented and quite easy to use. The Zsetup program can be used to configure the modem. It will also create an Autoexec file to set the system clock from the clock on an XL model if you wish.

Other programs let you use the Zoom/Modem to dial voice as well as data calls, set up an incoming message buffer, create a dial-in welcoming message, set up password screening and direct Hayes-style AT commands to the modem from the keyboard.

The Zoom/Modem works well with existing communications software. The Zoom/Disk software, for the most part, is directed toward making the enhanced features of the tool available to users.

The second part of the Zoom/Modem PC programmer's guide offers a well-written, detailed description of the additional features of the product and how to make use of them. Sophisticated corporate users interested in making use of PCs for serious applications requiring modem communications will find that the Zoom/Modem 2400 XL offers many useful features.

The Zoom/Modem PC is an excellent product that delivers solid value. If Zoom Telephonics was a larger and better known company, its share of the modem market would be growing even faster than it is, limited by the company's relatively modest advertising budget.

In this case, however, having built a better mousetrap is likely to make Zoom a more well-known company as word of its products gets around. It isn't very often that you see a product this good priced so aggressively.

Zachmann is vice-president of research at International Data Corp.

Driver links Mac, impact printers

NEW YORK — Brother International Corp. last week unveiled a software driver that enables users of all Apple Computer, Inc. Macintosh computers to create documents on its entire line of impact printers.

Jointly developed with Softstyle, Inc. of Honolulu, Macdriver addresses the one obvious limitation of the Macintosh — a lack of printer options beyond Apple's Imagewriter dot matrix and Laserwriter laser printers. The driver, marketed by the Piscataway, N.J., subsidiary of Brother Industries Ltd. of Japan, allows its low-cost 9- and 24-pin dot matrix printers and a dual printhead dot matrix/daisywheel printer to generate hard copy from Macintoshes.

Available now, Macdriver lists for $99 and comes with cable, software and operating manual. Macintosh users can connect the cable to the computer's serial port and copy the software onto their system's disk, the firm said.

Brother said it began developing Macdriver about one year ago at the request of its resellers.

The New CPT 9000. Bigger, Faster, and more Productive than Macintosh.™

Run your favorite desktop publishing software on a full-page, high resolution, black-on-white screen.

The larger screen on the AT-compatible CPT 9000 allows you to view and work on a full-page document. At the same time. You save the time and effort Macintosh users spend scrolling up and down. / Visualizing the entire page means a more creative input and a more productive output. / And connected to a CPT Laser Printer, the CPT 9000 system can print camera-ready materials faster than the Macintosh. / The CPT 9000 workstation is expandable. Eight slots offer you the opportunity to keep up with your expanding desktop publishing needs. The CPT 9000 starts at $3,995.

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The New CPT 9000. Bigger, Faster, and more Productive than Macintosh.
The New CPT 9000. Bigger, Faster, and more Productive than Macintosh.

Benchmarks

CONTINUED FROM PAGE 33

high likelihood of being good in general.

Regrettably, many benchmark tests were designed for dramatic impact, which inflated results seem to aid. For this series, I will use a floating-point and transcendental test I designed to be largely free of false results. In addition, this test shows off some of the power of a good programming approach without the hype.

Some years ago, a class of my graduate students told me that a problem I had given them was impossible. Upon investigation, we discovered that what had really happened was the correct result caused an overflow on their pocket calculators. The answer involved a factor of 10 to the power of about 400. The correct approach to this problem required a modest knowledge of common logarithms.

Similar issues can arise with statistics in which large permutations or combinations are involved.

With this insight, examine the problem of finding the factorial of 10,000. Recall that 4 factorial (4!) is just the product of multiplying 4 by 3 and 2, or 24. On a handheld calculator, with 10 to the 99th power as an upper numeric limit, you can calculate 69 factorial. Different computer systems overflow before a couple hundred factorial. But 10,000 factorial has exactly 35,660 decimal digits.

> BASIC has nearly come of age. Most modest to medium-size projects can be undertaken, at least for logic test purposes, in Basic.

And we arrive at Elkins' Log (10k!) speed and accuracy benchmark. This number can be calculated by the following very simple Basic program:

```
10 DEFINT I
20 DEFDBL X,Y
30 FOR I = 2 TO 10000
40 Y = I
50 X = X + LOG(Y)
60 NEXT I
70 PRINT X/LOG(10#).
```

The variable I is defined as an integer to loop as fast as possible, and the PRINT statement includes the denominator Log (10#) to convert the Log function to base 10 from whatever base (usually e) the system uses. Notice that the 10 in parentheses must be double precision or the results will lose half the accuracy. Note also that this last division has a negligible effect on the runtime of the test program.

The time to execute this program depends almost entirely on the calculating ability of a computer/Basic programming language system. The accuracy of the results is a telling indicator of internal precision as well as a fine complement to the usual benchmark tests.

In addition to the raw numbers, benchmarks give insight into a programming language's utility, just from the effort of running them. This extra data is usually not included with the numeric results.

Ease of use started with APL. The benchmark used here was just a bit of a single line of command-line code for APL, programming effort was nearly zero. MathCAD came in second for ease of use with two statements in a single line of code, no program needed. Of the Basics, True Basic was first in ease of use. Without any need for type declaration, the True Basic program was half the length of the listing. Points off, however, for True Basic's silly PRINT USING requirements and its inability to read in the program from another Basic's file.

Better Basic, GWBasic, Quick Basic and ZBasic all came in tied for fourth place. In each system the program was just read in, compiled/interpreted in memory and run right from the programming editor. All of the other systems were completely compatible with the program SAVED, A from GWBasic.

There is a considerable jump in workload with the IBM compiler. The program can be read in directly, if it is available; it cannot be written in system as is possible with the other Basics. It must be compiled with the /O option, then linked with the separate link program to produce an independent EXE file.

The 87Basic system was even tricker. For some reason it would not link without specifying the full file spec for the library file, even though this file was in the default directory.

The results were that progams taking advantage of math coprocessors were the fastest based on the Log (10k) Benchmarks. True Basic 2.01 took 3½ seconds, and Better Basic 2.1 took 10 seconds. Quick Basic 2.0 took 56 seconds, and GWBasic took 149 seconds, but none of the products take advantage of math coprocessors.

The size of the files created by the programs also varied. Better Basic created a 48K-byte file, with 82K bytes for True Basic and 27K bytes for Quick Basic. For accuracy, ZBasic came out on top, with Better Basic close behind.

In conclusion, Basic has nearly come of age. Two systems are nearly as fast as RM Fortran. Most modest to medium-size projects can be undertaken, at least for logic test purposes, in Basic. I know a few full-size projects have used compiled Basic acceptably well.

Elkins is computer and management consultant with a degree in electrical engineering.

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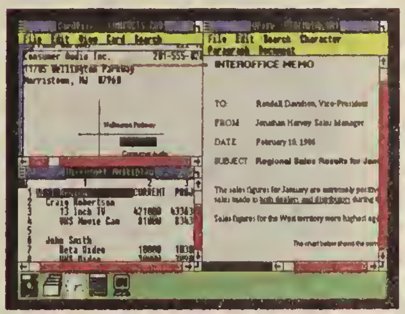

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Apple's goal

FROM PAGE 33

good or better. The timing of corporate networks coming together, and the need for workstations to access networks that people are willing to use, has helped us.

What's your strategy for getting MIS to consider Apple products?
In the past year and a half, through our national accounts program, we have absolutely been focusing our efforts on no longer coming in the back door by just having a few people within an organization adopt the Macintosh, but [on] talking to the heads of information services or DP or whatever their title was, about [adopting] Macintosh as one of their accepted standards. [Getting on] the approved vendor list is very important, or you virtually get locked out of a corporation. There is a fairly long list of companies who have taken us on as an approved vendor in the past year and a half.

How many?
I'm personally aware of 20, but there are probably more than that.

What are you doing to entice users entrenched in the IBM world?
First, we're finding those [kinds of users] are less and less predominant, as DEC begins to make even more significant inroads. So the idea of multivendor environments is becoming much more the commonplace.

Second, we go after those with the same approach that any other processing or telecommunications company would — that is, work very hard to show them why our technology is superior.

We'll emphasize where our product differs from others and why we think that's important to business.

Improvements

FROM PAGE 33

firms with strong antipiracy policies."

He said he was surprised at users' comments that they do not hunger for frequent upgrades. "We in the industry always push for more updates, more updates," Wasch said. He also agreed that every single bug does not require an upgrade.

"Obviously, users have a right to know about bugs that are major, but the SPA can't ask its members to send letters to users every time they find a bug," Wasch added.

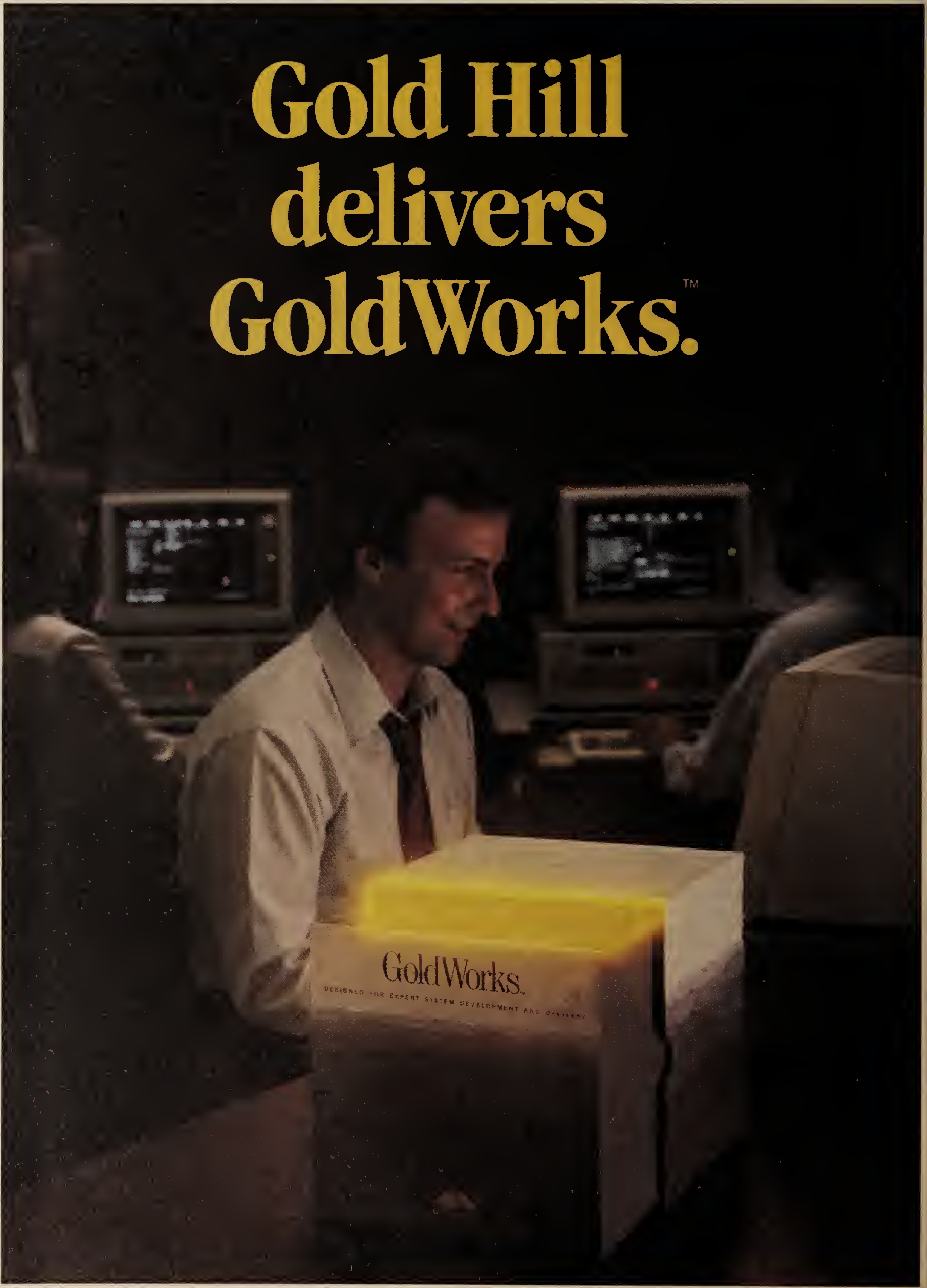
The SPA represents more than 200 microcomputer vendors, ranging from education and entertainment package developers to business software vendors.

Pursuing site licenses
Negotiated site licenses — something recommended by the Microcomputer Managers Association survey to resolve many of the complaints — are also a marketing issue some vendors choose to pursue, according to Wasch.

Pricing, support, long-term obligations, distribution and legal rights are among the key items to cover, the survey said. Also, users asked vendors to propose licensing that meets individual customers' needs, not a blanket license.

The typical survey respondent was a corporation or government agency with more than 100 personal computers, considerable in-house expertise and resources and minimum and specific technical requirements but unable to quickly react to industry changes because of the number of users involved. Yet new systems are bought daily to run hundreds, if not thousands, of different applications software packages. The typical surveyed company was installing computers in locations across the country or around the world.

Kask said the survey has already been successful, by spurring debate and discussion among users and vendors. He said the survey will be presented to members of the ad hoc Microcomputer Vendor Advisory Board, composed of representatives from large vendors and vendor organizations, including the SPA.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NEW PRODUCTS

Systems

CIE Systems, Inc. has introduced the **CIES/286**, a multiuser IBM Personal Computer AT-compatible system.

The CIES/286 is said to support Pick Systems' Pick Operating System, Unix, Ryan-McFarland Corp. COS and Microsoft Corp. MS-DOS operating systems. It is based on the Intel Corp. 80286 processor running at 6, 8 or 10 MHz with memory expansion to 12M bytes. It features standard RS-232 cables.

The standard models include a two-user system with a 40M-byte hard disk drive, floppy drive, 512K bytes of memory and a system console for $5,960; a six-user system with an additional 60M-byte streaming tape drive, priced at $8,085; and a nine-user system with a 70M-byte hard disk drive, priced at $9,800.

CIE Systems, 2515 McCabe Way, Irvine, Calif. 92714.

Software applications packages

Cimpac has introduced **Cimpal Manufacturing**, an integrated inventory and production-control system.

The Cimpal package is structured within Oracle Corp.'s Oracle relational data base system. It operates on a variety of hardware systems including IBM Personal Computers and minicomputers from vendors such as Digital Equipment Corp., Hewlett-Packard Co. and Prime Computer, Inc.

The runtime license for Cimpal Manufacturing on an IBM PC costs $12,000, including an Oracle runtime license.

Cimpac, Damonmill Square, Concord, Mass. 01742.

Iconnex Corp. has announced **M. E. Workbench**, a personal computer-based mechanical engineering software product.

The software is said to combine geometric modeling, variational geometry, equation-solving, spreadsheet and word processing. Changes made to the design automatically trigger data recalculations systemwide, so the windows always reflect the most up-to-date data on the design.

The conceptual design may be transferred to standard computer-aided design, manufacturing and engineering systems, according to the vendor.

M. E. Workbench costs $2,350.

Iconnex, 1501 Reedsdale St., Pittsburgh, Pa. 15233.

Software languages

Eyring Research Institute, Inc. has ported Certified Software Corp.'s **Omegasoft Pascal** to run under its **PDOS** operating system.

Omegasoft Pascal includes a compiler, assembler, linker, host-debugger, target-debugger, screen editor and Pascal shell. It is said to produce relocatable object code directly, ready for linking. The compiler can generate assembly language source. Runtime source is included with the compiler.

The compiler costs $900.

Eyring Research Institute, 1450 W. 820 N., Provo, Utah 84601.

Avyx, Inc. has announced **Trees-PLS**, a programming language for IBM Personal Computers, PC XTs, ATs and compatibles.

Trees-pls is said to allow programmers to create applications for scheduling projects that must be completed within a fixed amount of time. It is a resource-management tool featuring the ability to perform list-processing types of functions by manipulating tree structures.

Trees-PLS is priced at $995.

Avyx, 265 Honeywell Center, 304 Inverness Way South, Englewood, Colo. 80112.

Software utilities

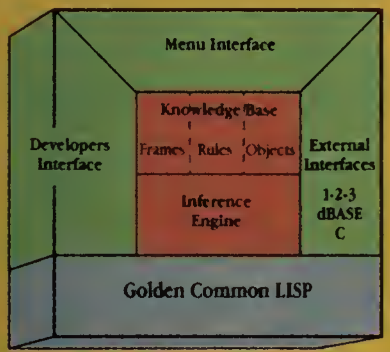
Transec Systems, Inc. has announced **Unlock Masterkey**, which is a copy protection re-

Continued on page 41

Now you can build and deliver serious expert systems on advanced PCs.

GoldWorks changes the economics of expert system building.

GoldWorks, formerly code-named Acorn, is designed for professional software developers who need to build serious expert systems and integrate them with conventional applications running on 286- and 386-based PCs. It combines the best features of high-end expert system tools with the ability to develop and deliver expert systems *inexpensively,* on advanced PCs.



GoldWorks is the most comprehensive expert system tool available for advanced PCs.

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GoldWorks gives you the best features of an expert system shell. With the easy-to-use menu interface, you can rapidly prototype and build expert system applications without knowing the underlying programming environment. And you get the GoldWorks tutorial, the San Marco LISP Explorer® tutorial, an on-line help system, and example applications to get you started quickly.

Works like a toolkit.

GoldWorks gives you the best features of an expert system toolkit. You can access the underlying programming environment to extend and customize the system for your specific applications. And you can address up to 15 MB of extended memory on the PC AT (and even more on 386-based PCs).

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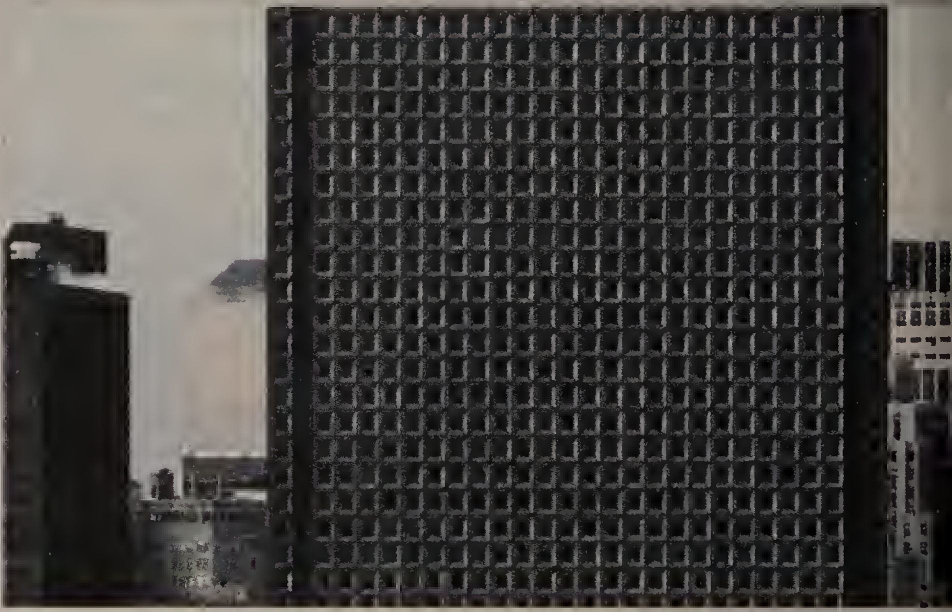

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San Francisco	April 21	New York	April 29	Cleveland	May 6	Toronto	May 13
Los Angeles	April 22	Kansas City	April 30	Denver	May 7	Hartford	May 14
Seattle	April 23	Boston	April 30	Cincinnati	May 7	Newport Beach	May 19
Vancouver	April 23	Houston	May 5	New Jersey	May 12	Ft. Lauderdale	May 19
Chicago	April 28	Detroit	May 5	St. Louis	May 12	Atlanta	May 20
Philadelphia	April 28	Dallas	May 6	Washington D.C.	May 13	Raleigh	May 21
Minneapolis	April 29						

Continued from page 37

moval program.

Unlock Masterkey is said to have the ability to break more than 80 specific programs. It has an analyzer that determines if the copy is protected by either Prolok or Superlok. It includes a generic unlocker for unlocking programs protected by either of the two and a Superlok unlocker for programs installed on a hard disk. According to the vendor, the unlocked programs are identical to the original, with the copy protection removed.

Unlock Masterkey is available for the IBM Personal Computer, PC XT and PC AT. It costs $159.99.

Transec Systems, Suite 200, 220 Congress Park Drive, Delray Beach, Fla. 33445.

The Source Telecomputing Corp. has introduced **Re: Source**, an IBM Personal Computer interface software package.

The software is said to simplify the use of on-line services. According to the vendor, it simplifies the codes, steps and commands necessary for the user. It sets up a card catalog that contains descriptions of the product and allows users to automate frequent tasks. It also allows interactions between the service and the user to occur off-line. User entries can be edited and corrected before a connection has been established.

Re:Source is priced at $89.

The Source Telecomputing, 1616 Anderson Road, McLean, Va. 22102.

Micromath Scientific Software has announced **Directory Window**, a memory-resident directory utility.

The utility is said to provide access to various file commands without obscuring or disturbing the primary computing activity displayed on the screen. Users can scroll through Microsoft Corp. MS-DOS file directories.

Directory Window is priced at $14.95.

Micromath Scientific Software, Suite 204, 3690 E. Fort Union Blvd., Salt Lake City, Utah 84121.

Custom Real-Time Software, Inc. has announced **Stopwatch**, a memory-resident utility said to measure and present total and component times of programs executed on IBM Personal Computers and compatibles.

Stopwatch makes measurements independently of clock speed or type of processor, the vendor said.

The Stopwatch package includes a diskette and a user's manual. It costs $59.95.

Custom Real-Time Software, P.O. Box 1106, West Caldwell, N.J. 07007.

Software enhancements

Articulate Publications, Inc. has announced the second version of the **Extended File Handling** option for the **Medicalis & Dentalis** health-care practice management system running under the CP/M-86 and Concurrent-DOS operating systems.

Medicalis & Dentalis features pop-up windows, electronic claims submission and automatic insurance preverification and benefit predetermination, according to the vendor.

Medicalis & Dentalis is priced from $6,995.

The Extended File Handling option costs $995.

Articulate Publications, 402 N. Larchmont Blvd., Los Angeles, Calif. 90004.

Data Business Vision, Inc. has announced Novell, Inc. Network compatibility for IBM PC-DOS, CTOS and BTOS systems for its family of graphics software, **Private Eye**, **Graffhopper** and **GDSS**.

Private Eye was designed to provide on-line, up-to-date graphics and text reporting using customized menus. Graffhopper includes 101 preformatted graph types and a customizable command language. The menu-driven software is said to interface with various data file types and to accept batch processing.

GDSS provides all the charting features of Graffhopper plus advanced charting functions, statistical analysis, data query functions and freehand drawing capability.

Depending on the operating system, Private Eye costs from $99 to $1,500, Graffhopper costs from $295 to $2,000 and GDSS costs from $795 to $3,500.

Data Business Vision, Suite B, 3510 Dunhill St., San Diego, Calif. 92121.

Diversified Computer Systems, Inc. has announced an enhanced version of its **EM220** Digital Equipment Corp. VT220 and VT102 terminal emulation package and its **EM4010** Tektronix, Inc. 4010 and VT220 emulator.

The emulators are said to include Wordperfect Corp.'s Wordperfect mode that allows users of the DEC VAX version of Wordperfect word processing software to edit documents using keystrokes identical to those used in the personal computer version. Other features include support for the IBM enhanced keyboard, additional 132-col. modes and support for the Ungermann-Bass, Inc. local-area network, Net/One. The emulators also transfer Wordperfect documents between the personal computer and the VAX.

Pricing for IBM Personal Computers are $169 for the EM220 package and $249 for the EM4010 package.

Diversified Computer Systems, Suite 1B, 3775 Iris Ave., Boulder, Colo. 80301.

Xerox Corp. has enhanced its **Xerox Ventura Publisher** software for the IBM Personal Computer.

The software now features 80 new features including conversion for Hewlett-Packard Co. Soft Fonts and the ability to use the entire library of Adobe Systems, Inc. printer and screen fonts with any Postscript printer.

According to the vendor, other enhancements include the ability to import text files from word processing packages; support for all three industry-standard page-description languages; support for simultaneous on-screen hyphenation of English and any one of five other languages; pictures anchored to text; and font sizes up to 254 points.

The Xerox Ventura Publisher costs $895.

Xerox, Xerox Square, Rochester, N.Y. 14644.

Data storage

Systems Peripherals Consultants, Inc. has announced the **Remedy series** of removable Winchester disk drives for IBM Personal Computers.

The Remedy series offers single half-height 5¼-in. disk drives ranging in capacity from 20M to 50M bytes. They can be installed in any PC with a hard-disk controller. They use standard DOS utilites for copying files. Both ST-412 or small computer systems interface drives are available.

Remedy series drives are priced from $795.

Systems Peripherals Consultants, 9747 Business Park Ave., San Diego, Calif. 92131.

National Memory Systems Corp. has announced the **C-8006A system**, a 689M-byte disk system for Compaq Computer Corp. 386 applications.

The subsystem is said to feature a single-slot controller supporting four disks and support for disk data rates to 2.45M bit/sec. The C-8006A is said to be compatible with most networks. It was designed for use with operating systems such as Microsoft Corp.'s MS-DOS, Xenix, Micro Port Xenix, AIX and AT&T's Unix System V, Release 3.

The C-8006A is priced at $13,500 including controller, cables and software.

National Memory Systems, 355 Earhart Way, Livermore, Calif., 94550.

Printers/Plotters/ Peripherals

Digital Communications Associates, Inc. has announced **Alecprint**, a stand-alone printer emulator.

Alecprint attaches to an IBM System/34, 36 or 38 via twin-axial cable. It is capable of emulating IBM 5219, 5256, 5224, 5225 and 4214 printers. It con-

Continued on page 42

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Continued from page 41

tains a parallel and a serial port, allowing either type of port to be attached to a personal computer. PC printers supported by Alecprint include the Hewlett-Packard Co. Laserjet, the Epson America, Inc. FX and LQ 1000, the IBM Proprinter and Quietwriter and the NEC Information Systems, Inc. Spinwriter 3550/8810.

Alecprint costs $1,395.

Digital Communications Associates, 1000 Alderman Drive, Alpharetta, Ga. 30201.

Microphonics Technology Corp. has announced its **Litewriter** line of laser printers.

The Litewriter printers are said to feature the vendor's Litewriter command language — which gives the user control over the printers' output via English-like commands — as well as the Litewriter font system, which is a custom-font generation system that allows the user to vary typeface, point size, character skewing, rotation, pitch and vertical and horizontal bolding.

The Litewriter printers cost from $1,995.

Microphonics, Suite B, 25-37th St. N.E., Auburn, Wash. 98002.

Board-level devices

New Media Graphics Corp. has announced the **PC-Graphover II**, a graphics-overlay board set for IBM Personal Computers.

The PC-Graphover II is said to allow a PC to control videodisk playback and superimpose text and graphics on the video. It features flicker-free display even while drawing graphics or text, full-screen overlay without blank margins and 760- by 480-pixel resolution as well as a double-buffered display memory for animation, the vendor said.

Software available for the PC-Graphover II includes an authoring package and a graphics paint package with 20 fonts.

PC-Graphover II is priced at $1,990.

New Media Graphics, 279 Cambridge St., Burlington, Mass. 01803.

Auxiliary equipment

Ergotron, Inc. has announced **Mouse Cleaner 360**, a computer mouse cleaning system.

Mouse Cleaner 360 is said to clean the tracking rollers inside the mouse to eliminate jerky movements and slow mouse reponse. The kit comes with a Velcro-covered scrubber ball, scrubber board, lint-free chamois cloth and a bottle of cleaning solution.

Mouse Cleaner 360 is said to be compatible with personal computer mouses using a 1-in. diameter positioning ball, including Microsoft Corp's. Mouse for the IBM PC and Apple Computer, Inc. Macintosh, Apple IIe, IIc and IIGS.

Mouse Cleaner 360 is priced at $16.95.

Ergotron, 1621 E. 79th St., Minneapolis, Minn. 55420.

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IDMS	DBMS	Wang/VS	Novell
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And, to communicate in all those worlds, FOCUS has hooks into a growing number of LANs and other network products. This means that a user of FOCUS at an IBM PC, for example, can ask for data from FOCUS in another PC. Or in an IBM mainframe.

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DATA STREAM

Patricia Keefe

Battle at the LAN corral

As innumerable local-area network (LAN) vendors and analysts have said, "Whoever controls the networks controls the corporate account."

Look, it's the LAN shootout! It's dueling file servers! No — it's the battle of the network operating systems! In one corner we have the heavyweight LAN champion, Novell, Inc.'s Netware; in the other, the challenger, Microsoft Corp.'s Networks (MS-Net), nee the LAN Manager. (Enhanced or otherwise, the IBM PC Network Program software is not a serious contender in this bout.)

The trade press is abuzz with talk about the latest — and possibly most long-term — showdown in the volatile personal computer networking arena. By announcing its intent to get applications developers to accept its MS-Net interface as the PC networking standard, Microsoft automatically assumes the role of challenger to Novell's grip on a good part of the PC network market.

The MS-Net protocol — in

Continued on page 52

Users boo Olsen's MAP attack

BY ROSEMARY HAMILTON
CW STAFF

Mention the name Ken Olsen to manufacturing executives and you will quickly find that the Digital Equipment Corp. chairman is not a popular man these days.

Olsen's recent criticism of the Manufacturing Automation Protocol (MAP), the proposed factory networking standard, has stirred up plenty of anger among the ranks of the MAP/TOP Users Group.

In recent weeks, Olsen has publicly questioned the benefit of pouring time and money into establishing a new factory networking standard when, according to Olsen, Ethernet is available now and is sufficient for the factory environment.

Many manufacturers say they are outraged that Olsen would publicly gripe about MAP, and a few users have gone so far as to say that the DEC chairman was pulling a publicity stunt aimed at swaying uncommitted users over to his company's proprietary networking system, Decnet, which is based on Ethernet.

"All he's doing is throwing a bug into the whole MAP system," says William Geibel, staff electrical engineer at the Kaiser Aluminum & Chemical Corp. in Pleasanton, Calif. "I am not happy with his remarks. I feel it's hurting MAP," he adds, "and I

Continued on page 52

Vendors still dominate standards efforts

BY ELISABETH HORWITT
CW STAFF

User organizations still are not taking an active role in communications standards development efforts, even though many MIS and communications managers recognize that the outcome will directly affect their companies' networking environments.

Of 55 Fortune 1,000 companies responding to a February survey conducted by Cambridge, Mass., consulting firm Forrester Research, Inc., only 13% said they had influence on Open Systems Interconnect (OSI) standards development. An even smaller percentage said they had a voice in the evolution of Integrated Services Digital Network (ISDN), Manufacturing Automation Protocol (MAP) or Technical Office Protocol (see chart right).

At a recent meeting of the New England Chapter of the Association of Data Communications Users (ADCU), several communications managers said they were unsure of what type of cabling to install in new buildings because they feared that the advent of ISDN would make obsolete current specifications for connection to communications equipment and services. Many of the same managers told *Computerworld* that they "didn't want to hear about ISDN until it becomes a commercial reality that we can access," and voiced a similar attitude toward OSI.

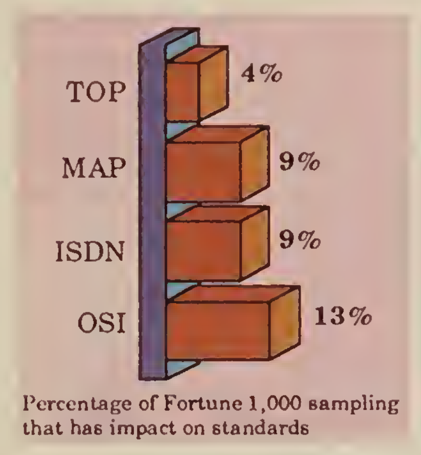
The ACDU is not alone: Forrester reports that many survey respondents described ISDN as still "more a concept than a business application." One manufacturer said that while "standards will play an important and key role in our network planning . . . users are afraid to become enthusiastic about OSI because they may not be in the majority. Too big an investment is at stake to make the wrong move."

Some users seem to take for granted that standards group meetings are primarily used by vendors as arenas in which they battle to get their proprietary

Continued on page 51

Standards organizations still lack user voice

Some user companies complain of being shut out by vendors; others say 'why bother?'



Percentage of Fortune 1,000 sampling that has impact on standards

INFORMATION PROVIDED BY FORRESTER RESEARCH, INC.

Net costs exceed estimates

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — The cost of linking personal computers together to share files, printers and other resources drastically exceeds user expectations, according to David Ferris, chairman of the Ferrin Corp.

This is because too often users forget to factor in the "people costs" of network technology, he said.

Ferris recently led a three-day Technology Transfer Institute seminar entitled "PC LANs: What You Really Need to Know." Ferrin specializes in applications development and local-area networks (LAN) systems integration.

The primary costs of a LAN arise from the time needed to manage and administer the system, unproductive time consumed while using special networking facilities and the cost

Continued on page 51

Inside

- Third-party net vendors rush to support PS/2, OS/2. Page 46.
- Rolm's IBM PC-to-CBX link uses standard software. Page 47.
- Infotron Systems division unveils tabletop communications switch. Page 54.

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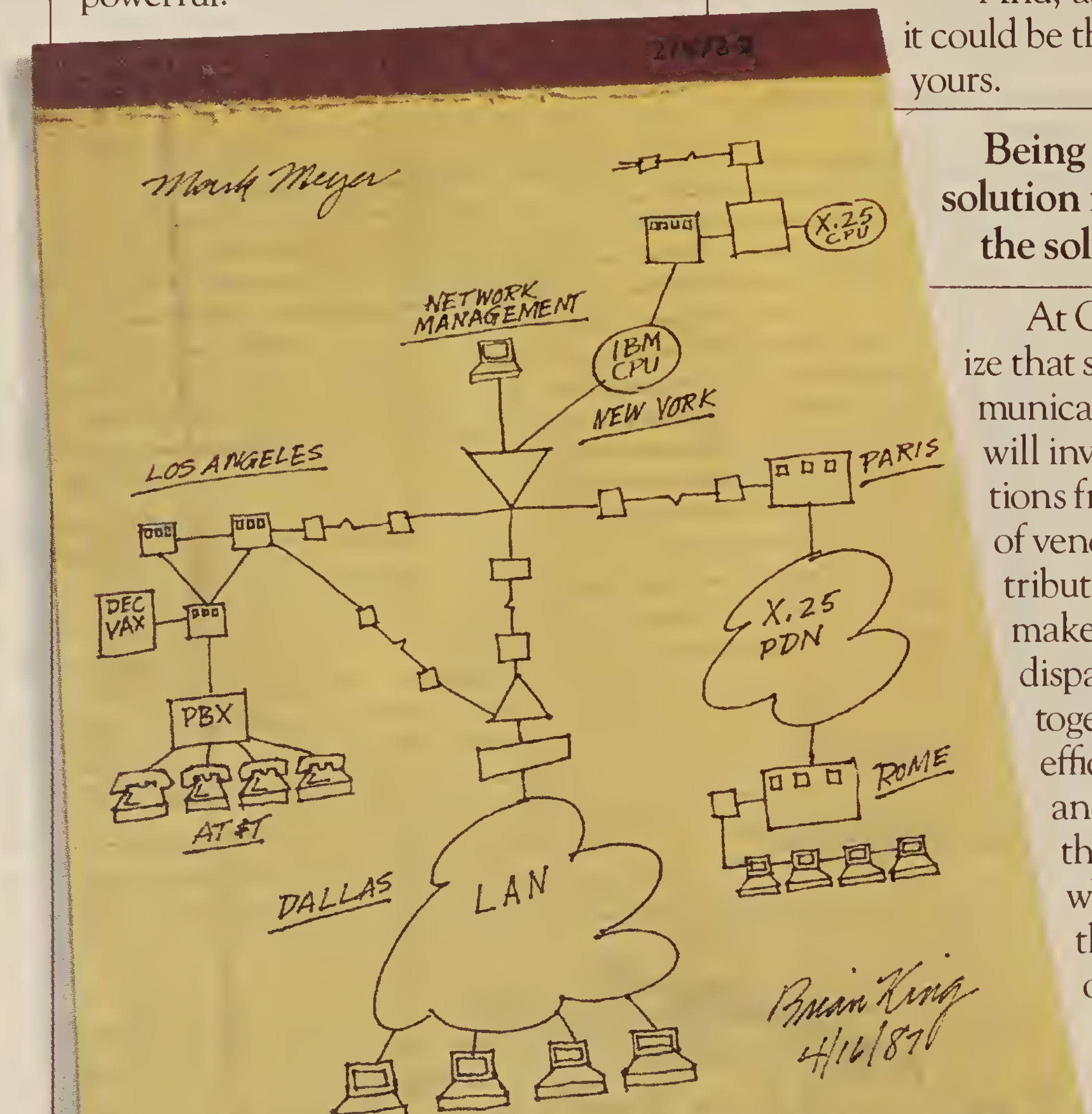

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Perhaps Codex' greatest advantage is our independence. We're not a computer company. We're not a phone company. We're a network company. So, in our 25 years of designing network solutions, we've worked with all sorts of equipment companies. And we've worked in countries all over the world. So we can maximize the performance and functionality of all the pieces of your network, regardless of which vendors they came from. Or where they are.

But simply designing solutions isn't all we do. We also support our solutions with a wide breadth of networking products. Our history of innovative product capabilities means you're getting reliable, high-quality communications products that will make your particular network as productive as possible. Because we address a variety of areas, we're never in a position of trying to force fit a particular technology into a solution. So we're able to analyze your needs objectively. The result? A productive, efficient network. Which, after all, is the only kind of network anyone wants.

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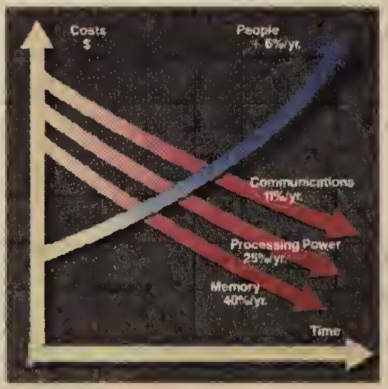

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1985

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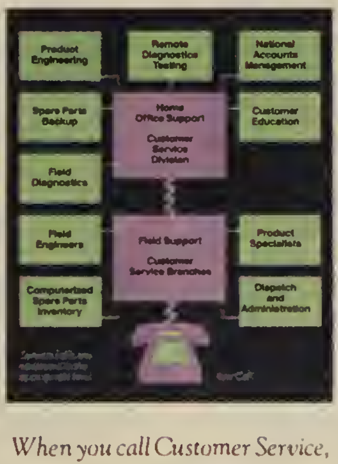
To do this, we have invested an enormous amount of time and money in R&D over the years. This commitment has made us keenly aware of the issues that face you and the kind of network problems that are likely to face you in the future.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To help us further accommodate your company's future growth, Codex is very active in industry standards committees, helping to create the kind of "open architecture" that will allow you to link equipment from many vendors in a more productive way. With that kind of support, your network will be able to grow by leaps and bounds. And your business along with it.

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Codex is currently working with 97% of the Fortune 100. These companies, like yours, have to rely on their network for success. And, since they're considered to be among the most successful companies in the world, it would appear that our network solutions are working. And that the experience we've gained from those associations and others can be put to work just as successfully for your company.

In fact, in a recent *Data Communications* survey, many of these and other companies consistently ranked Codex first as the networking vendor they preferred in categories ranging from best price/performance to technology to customer support.

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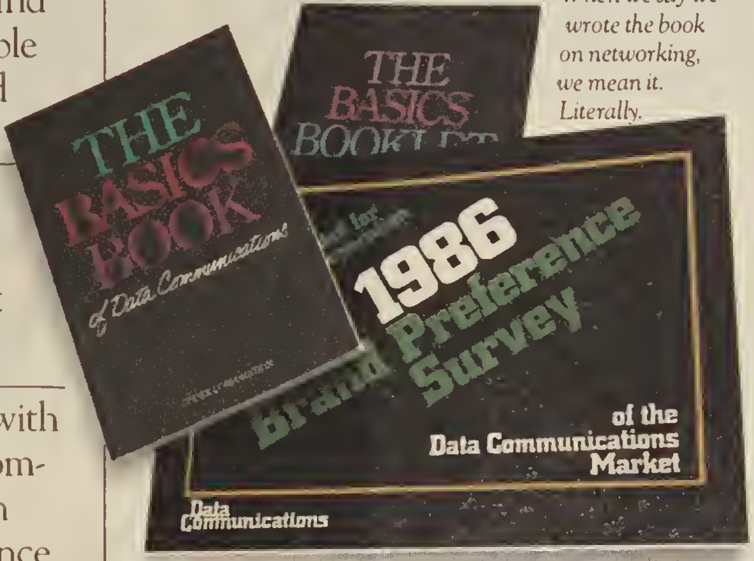

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See Codex at booth #1620 at the ICA show, May 18-21.

Network vendors line up behind IBM

BY PATRICIA KEEFE
CW STAFF

In the aftermath of the IBM product blitz, third-party network vendors are wasting little time announcing the obvious: To a company, they will support the IBM Personal System/2 family, along with Operating System/2, IBM and Microsoft Corp.'s protected-mode MS-DOS.

A chorus of network adapter manufacturers have pledged to retrofit their hardware for compatibility with IBM's new micro channel (bus) structure, featured in the PS/2 Models 50 through 80. Release dates range anywhere from 60 days to whenever OS/2 ships.

Palo Alto, Calif.-based Nestar Systems, Inc.'s contract to resell IBM's Token-Ring cards will probably be extended to include IBM's micro channel-compatible adapter cards, said Nestar President Charles Hart.

"We're hoping this will give us at least a two-month jump on the competition," he said. IBM expects to ship the cards in July, while competitors are targeting fall deliveries.

Since the PS/2 Model 30 features the IBM Personal Computer AT bus, existing cards can be migrated. Several vendors said users are already adding Model 30s to their PC networks.

The IBM announcements will have a greater impact on third-party network software, requiring major rewrites to run under OS/2, some of these vendors admitted. The changes required to support MS-DOS 3.3 are relatively minor, said Mike Pflaumer, a vice-president with Centram Systems West, Inc. in Berkeley, Calif.

MS-DOS-oriented vendors said they will license Microsoft's OS/2. These vendors include 3Com Corp. in Santa Clara, Calif., Torus Systems, Inc. in Redwood City, Calif., and Nestar. "We will stay standard with DOS and whatever Microsoft releases," Nestar's Hart said.

Conversely, vendors with a stronger proprietary bent, such as Novell, Inc. in Orem, Utah, and Banyan Systems, Inc. in Westboro, Mass., have indicated they will probably emulate OS/2. Excelan, Inc. in San Jose, Calif., will write whatever drivers are necessary, but sees no need to license OS/2, said Marketing Vice-President Subhash Bal.

It is unclear which group will have a more difficult time adapting to OS/2 — those who steadfastly stand by MS-DOS or those who skirt the operating system.

The vendors outlined their plans as follows:

- Novell announced Advanced Netware support for MS-DOS 3.3 and the new Token-Ring and PC Network adapters. It will support OS/2 and Extended OS/2. Advanced Netware Versions 2.0a and 86 currently support the PS/2 line as network nodes. Version 2.1 will provide file server support.
- 3Com will license Microsoft's OS/2 and LAN Manager. Initially, 3Com will revamp only its Ethernet cards. As for the diskless 3Station, "It doesn't have the wrong bus or slots," 3Com Chairman Robert Metcalfe said.
- Nestar's Hart suggested the initial release of its own Token-Ring will be PC AT-compatible.
- Excelan will provide intelligent Ethernet controllers for the micro channel bus and Transmission Control Protocol/Internet Protocol (TCP/IP) networking software for MS-DOS 3.3, available by year's end. TCP/IP for OS/2 will debut when IBM ships in early 1988. Retrofitted hardware will be out by year's end.
- Torus faces a major rewrite of Tapestry, its icon-based network operating system, already underway for a year and a half. The revamp will feature OS/2 compatibility and internetworking ability.
- Centram also faces a major change in its network operating system, TOPS, a spokesman said.
- Banyan is studying the announcements, but will rewrite drivers within the next 30 days to run on the PS/2 Models 40 and 50.

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Baby/36 fits 3½-in. format

SANTA ANA, Calif. — California Software Products, Inc. announced that its Baby/36 software is now available on 3½-in. diskettes for the new IBM Personal System/2 computers.

Baby/36 software emulates the operating system of the IBM System/36 minicomputer to permit development and execution of RPG-II programs on IBM-compatible personal computers and local-area networks (LAN), according to the company.

The company claimed its Baby/36 is fully compatible with the PS/2 line and will run under either IBM's PC-DOS 3.3 or Operating System/2 when available as well as earlier releases of PC-DOS and Microsoft Corp. MS-DOS.

Stand-alone systems range from $650 for execution-only to $3,500 for complete RPG-II development and execution systems, while LAN versions run from $1,500 to $4,500 plus $100 per linked device.

Rolmphone gives IBM PCs PBX functionality

BY ELISABETH HORWITT
CW STAFF

SANTA CLARA, Calif. — Rolm Corp. has announced a voice/data communications add-on product that allows IBM Personal Computers to access the functionality of the CBX private branch exchange while running standard communications software packages, company spokesmen recently claimed.

Released during parent company IBM's recent blitz of Personal System/2-related introductions, the Rolmphone 244PC is said to provide PCs with the same telephone functionality and CBX connections as does Jupiter, Rolm's existing PC phone-set add-on.

But while Jupiter is a packaged solution that requires the use of Rolm hardware and software, the 244PC supports third-party communications software that conforms to the popular PC AT intelligent-modem command set, according to Rolm manager of data applications marketing Dennis Haar. Rolm hopes to encourage PC communications software vendors to rewrite their packages to take advantage of CBX functions through the 244PC interface, Haar explained. "For example," he said, "Borland International could rewrite Sidekick to take advantage of the message-waiting CBX feature." Users can also design their own communications software to interface with the 244PC, Haar added.

The 244PC is also reportedly the first commercial product to support Asynchronous Communication Device Interface (ACDI), a feature within IBM's Extended Operating System/2 protected-mode operating system. "The rationale behind ACDI is that any application program written for the PC can communicate independent of whether it is using a terminal emulation card, a local-area network [LAN] interface or the CBX," Haar said. "For example, you can use IBM's existing Asynchronous Communications Server to link a CBX to a Token-Ring LAN, and then a PC application written for ACDI can communicate across that connection."

Rolm group product manager Amy Beilharz commented, "The idea of ACDI is that an application does not have to be rewritten each time a new communications protocol, such as Integrated Services Digital Network, emerges."

Rolmphone 244PC reportedly plugs in to a standard PC asynchronous port connection without any special hardware. Priced at $695, it is scheduled for release in June, the vendor said.

Banyan gears up for marketing

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — With an eye toward the next stage of its growth, Banyan Systems, Inc. has named Richard Meise as president and chief operating officer.

Meise, formerly senior vice-president and chief marketing officer at Convergent Techologies, Inc., will report to Banyan Chief Executive Officer and Chairman David Mahoney.

Meise's hire completes the formation of the network systems vendor's upper management team, which will attempt to move Banyan away from its status as a technology company to a more market-oriented posture.

"We want to leverage off the product we've spent 3½ years developing and proving. We think [Vines network software] has a great deal of marketability," Mahoney said.

Banyan also promoted James Allchin to vice-president of reseach and development. Allchin was formerly vice-president of software engineering.

Strengthening sales and support

A top goal for Banyan this year is to triple its 1986 sales figures, Mahoney said. But the first order of business this year is to strengthen all channels of distribution, including direct sales and customer support relationships, Mahoney said.

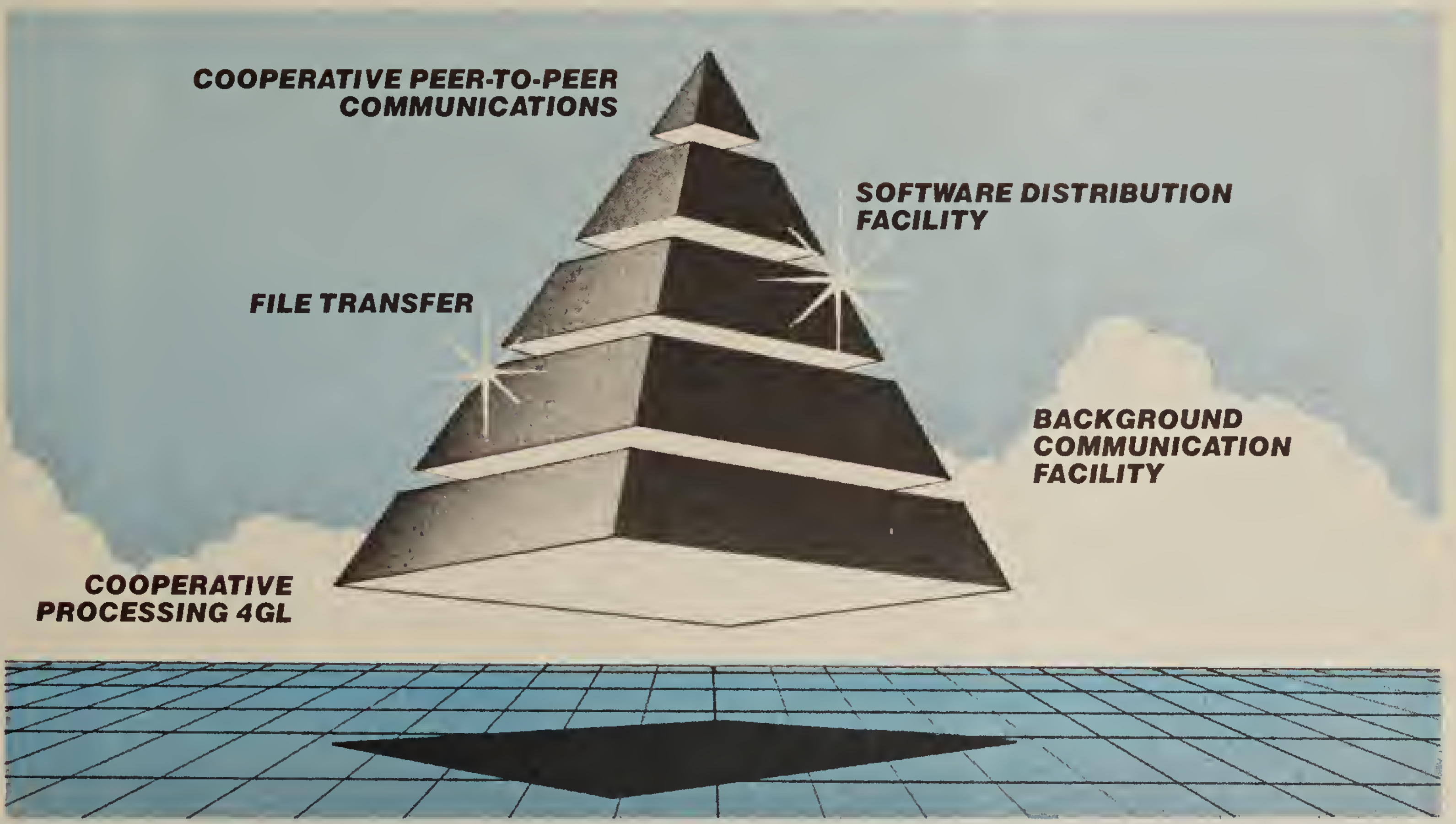
"Our next stage of growth requires that we build a strong worldwide sales and support organization and expand our business through all channels," Mahoney explained. "Dick [Meise's] overall strength is sales and marketing."

These plans should bring about a better focus on and understanding of end-user needs, Mahoney said, promising better teamwork between Banyan and its distributors.

A tighter coupling of direct and indirect sales efforts should result in better service and more timely support for Banyan users, he added.

On the product side, Mahoney acknowledged the company has Intel Corp. 80386-based products "in the works internally," but declined to be specific [CW, Jan. 26].

"We're taking a hard look now at what IBM has to offer, and we'll look at other 386 products on the market before finalizing our 386 strategy," he said.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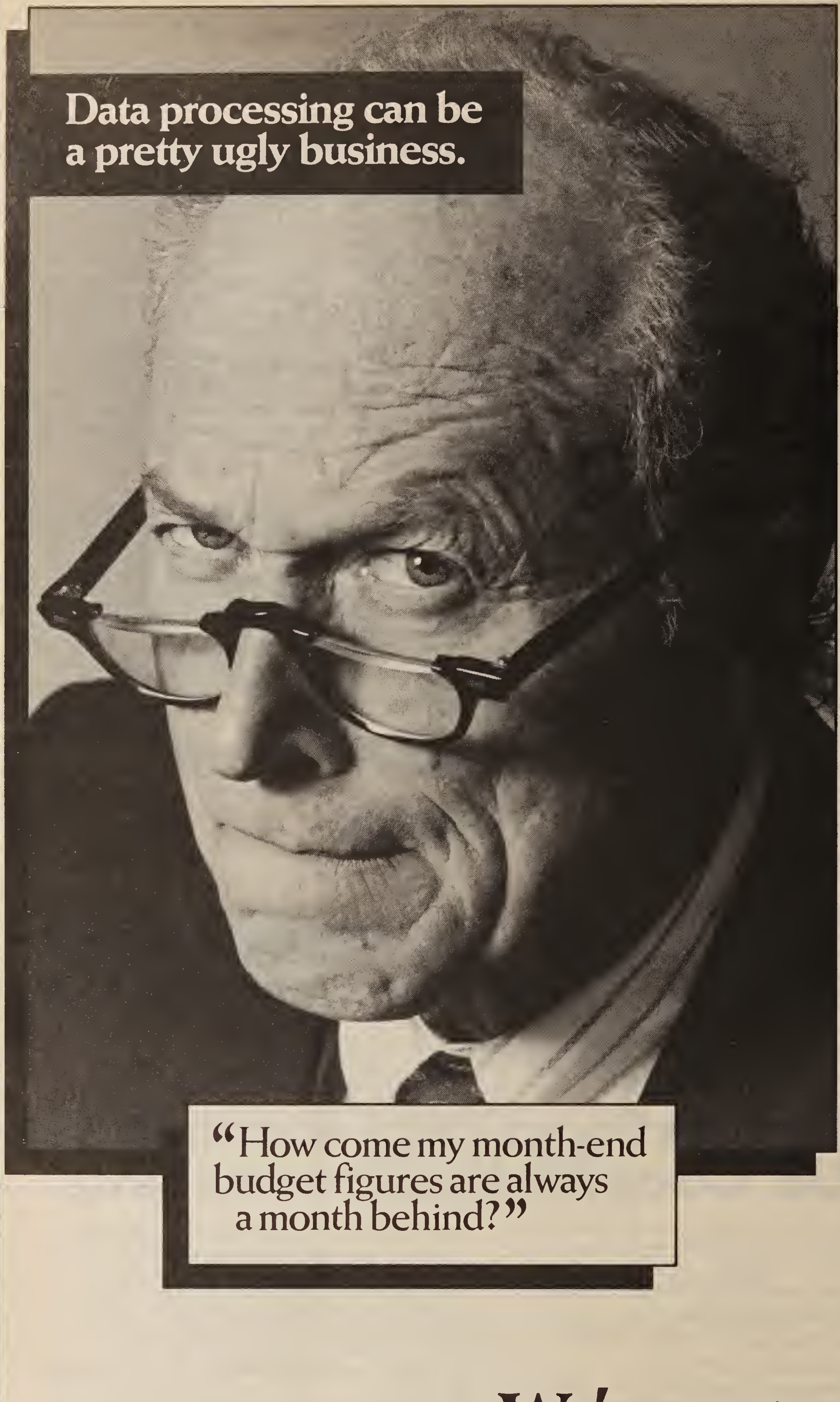

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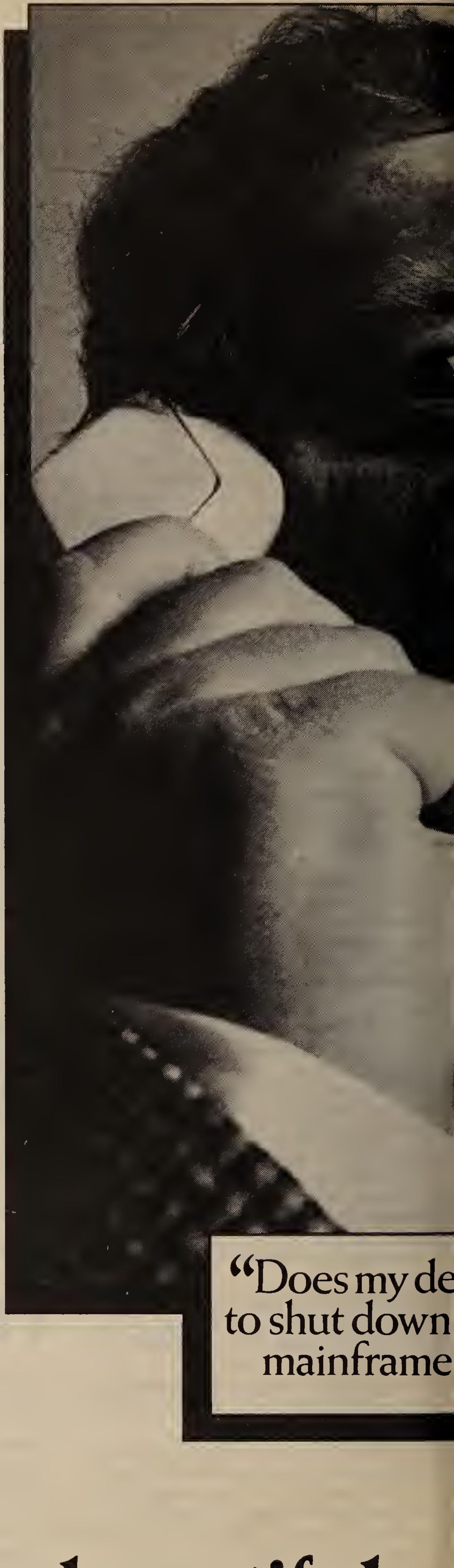

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Vendors

FROM PAGE 43

protocols incorporated into the standard.

"The International Standards Organization has been in existence for many years and is still embroiled in political turmoil — brought on by vendor arguments," another Eastern manufacturer told Forrester. "Too many versions of the OSI standard evolve, and it consequently becomes useless from any practical standpoint."

Vendor control

"Vendors want to take control of standards development, to add bells and whistles that will give them a proprietary edge," agreed Anthony Friscia, president of Chicago-based consulting company Advanced Manufacturing Research.

Friscia recalled an Institute of Electrical and Electronics Engineers, Inc. meeting several years back when IBM "ran in and put a wall up to stop Ethernet from becoming the only local-area network standard and opened the way for the Token-Ring."

Despite its user origins, MAP, too, has turned into a focus for vendor power plays, according to Doane Perry, senior telecommunications consultant for International Data Corp. (IDC) in Framingham, Mass.

"MAP standards are coming on strong, but vendors like Digital Equipment Corp. are beginning to kick and scream," Perry said. "DEC sees a key strategy of delivering high functionality through proprietary products which are internally coherent." (See story page 43.)

In contrast, MAP is generating strong support from companies like Data General Corp., "who hope that if they can drive MAP, they will cut into the Decnet market," Friscia observed.

Users don't see payback

The problem is that while vendors clearly see the payback for standards involvement, "investing in standards development will not directly impact the bottom line for a company whose business is building tractors or automobiles," Friscia said. "General Motors spent a lot of time and money on MAP, but have they made any money on it? No. But [MAP networking vendor] Concord Data Systems, Inc. has."

However, this wait-and-see attitude denies users the chance to make sure their own needs are addressed by the emerging standard, pointed out James Rothenberger, manager of communications planning at Carter Hawley Hale Stores, Inc.'s data center in Anaheim, Calif.

Carter Hawley is currently the only company to send a representative to the General Interest Group of the T1 Committee, which is largely responsible for determining standard interfaces between customer premise equipment and carrier services, which eventually could become part of ISDN.

Unfortunately, participation in a standards group means sending a technically savvy manager — whose time is expensive — to periodic meetings that are often held on the other side of the country.

"This commitment of staff resources can only be mounted by a certain size organization," IDC's Perry observed.

Share cost

User organizations such as the Telecommunications Association, the International Communications Association and the Communications Manager Association can get around this limitation by sharing the cost of representation among all members.

However, while all of these groups have hired legal counsels to represent their needs on regulatory issues to the Federal Communications Commission, they have yet to become involved with standards organizations, Perry said.

"It's still the vendors who care about the standards going their way," he added.

Net costs

FROM PAGE 43

of user education, Ferris said.

For example, in studies tracking the total three-year cost of five-, 40- and 100-node networks, Ferrin found that systems management created the biggest expense, ranging from 38% to 48% of the total cost. Unproductive user time contributed 17% to 28% of the cost factor, while training took from 17% to 24%. Conversely, hardware and software installation amounted to no more than 9% during three years.

Without these hidden costs, a five-node LAN typically costs about $13,000, while 40- to 100-PC networks cost about $70,000 and $150,000, respectively, he said. When the hidden costs are included, the real costs expand tenfold, Ferris claimed. He estimated that the total cost for three years usually amounts to about $150,000 for a five-node LAN, $800,000 for a 40-node LAN and $2 million for a 100-node network. Ferris based these figures on his experiences with selling and installing LANs in a wide variety of Fortune 1,000 companies.

While users often recognize the value of LAN technology, they tend to overlook the associated "people costs," he said. "Due to the size of the three-year investment, it's imperative that departmental management become more involved in the decision-making. . . . Most of my clients are wise to install a LAN, but it is financial suicide to make the decision based on the cost of the hardware alone," he added.

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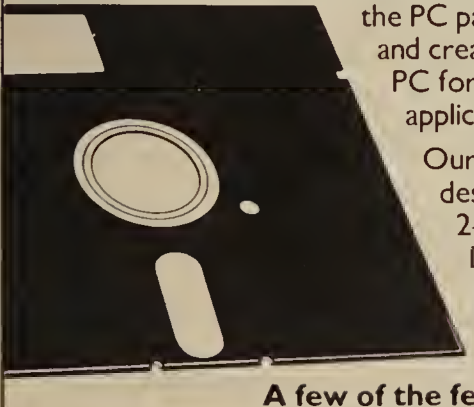

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Users boo

CONTINUED FROM PAGE 43

don't like that.”

Furthermore, users say, Olsen's comments come at a particularly bad time, because the MAP movement has recently lost some of the tremendous momentum it had a year ago. The lull is primarily attributed to the fact that the MAP 3.0 specification is behind schedule; MAP 3.0 products are not expected for at least another year. Because this is a slow time, and because of the clout Olsen and his company carry, many users say they feel his comments could damage their efforts to make MAP the factory networking standard.

“He's taking advantage of the state of MAP now, because it's going slower than anticipated,” says Stephen Hagan, manager of automation engineering at an NCR Corp. plant in Wichita, Kan., where a MAP pilot project is underway. “I think this is a power play put on by DEC.”

> “ETHERNET is like hitchhiking, and broadband is like taking a bus. By taking the bus, you have a set schedule to work with. With hitchhiking, you might get a ride immediately or you might have to wait for days.”
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Olsen has been quietly raising objections to MAP for at least a year. But recently, when DEC introduced a series of factory products, Olsen used the occasion to go public with his opinions. “Why another network? We've already got Ethernet,” Olsen said. He quickly followed up with a second MAP attack a week later during his keynote address at the ADAPSO Management Conference in Orlando, Fla.

“What's confusing is that DEC is always at the user group meetings touting MAP,” NCR's Hagan says. “If a user is on the fence about MAP right now, hearing the head of a company like DEC say those things might make [him] back away.”

Users also claim Olsen's statement that Ethernet is sufficient for the factory environment is simply not true.

“Decnet is a good solution, but I've yet to see a programmable controller with an interface to it,” says Daniel Miklovic, MAP project manager at Weyerhaeuser Co. in Tacoma, Wash.

Other users raise the issue of precision timing — which, they say, can be achieved with IEEE 802.4 broadband networks but not with Ethernet. “Ethernet is not good on the cell-controller level,” says a systems engineer at a Midwest manufacturer who requested anonymity. “The advantage to broadband cabling is that you can determine the time of response. With Ethernet, it's a random type of thing. You can't predict the performance — and predetermined timing in factory operations can be a very important thing.”

Kaiser's Geibel also raises this issue. “Ethernet is like hitchhiking, and broadband is like taking a bus,” he says. “By taking the bus, you have a set schedule to work with. With hitchhiking, you might get a ride immediately or you might have to wait for days.”

“DEC has put a lot of time and money into Ethernet,” Geibel adds. “Maybe they feel they're big enough to sway the market. But that's a gamble. I'm not swayed by Ethernet.”

“Ken [Olsen has] gotten a hell of a lot of publicity from this,” concludes Weyerhaeuser's Miklovic. “That's shrewd marketing. If he were lining up in support of MAP, he wouldn't get any coverage.”

LAN battle

CONTINUED FROM PAGE 43

particular the redirector portion — is the base on which a number of network vendors, including Novell rival 3Com Corp., have built their network operating systems. These vendors are committed to following the DOS standard and, most likely, any networking standard set by Microsoft.

Conversely, vendors such as Novell and competitor Banyan Systems, Inc. replace DOS with software that emulates DOS, at the same time overriding the liabilities of the single-user operating system.

At stake in this battle initially are software applications. Will applications be written to the proprietary Netware standard, for example, or to the DOS standard? Novell already has a head start in this area by virtue of being first into the market. The hearts and pocketbooks of end users will soon follow the path chosen by applications developers.

Long way to go

Despite support from some sectors of the networking market — including IBM, which uses MS-Net as a base for its PC Network Program — Microsoft has a lot of catching up to do before it overtakes IBM, never mind Novell.

Attendees at a recent Microsoft half-day seminar that detailed the new operating system and peripheral software found that Microsoft has focused most of its energies on protected-mode DOS, as opposed to its LAN Manager.

Microsoft is looking at the LAN Manager as part of an Intel Corp. 80286-based operating system positioned as the standard platform in the PC LAN market, according to Robert Clarke, an analyst with the Seybold Group in San Jose, Calif.

Unfortunately, Novell and even Microsoft's close OEM, 3Com, already have 80286-based network software on the market and should be well on their way to releasing Intel 80386 versions before Microsoft even gets its protected-mode 80286-based DOS out the door.

Microsoft not far along

Also, Microsoft's promises to “be faster and more flexible” were made in regard to MS-Net and don't appear to include plans to offer more features to the company's older version. In a sense, Microsoft is talking about competing with itself here. Meanwhile, by the time Microsoft is ready to catch up, Novell will have been in the market some six months with an 80386 product and a data base server, Clarke predicts.

“Microsoft definitely has a strategy saying, ‘This is what the LAN Manager will do,’ but they aren't very far along,” Clarke says, adding that Microsoft has not decided whether to put communications into its LAN Manager or DOS. IBM, of course, has already decided to put a lot of communications into its somewhat proprietary Operating System/2 Extended and is not likely to share that technology with Microsoft or anyone else.

IBM and Microsoft also differ in their focuses on servers. While IBM, along with Novell, is further along with its data base server, Microsoft has zeroed in on file service, seemingly drawing the line there and implying that Microsoft will not provide gateways or bridges. “Microsoft will look to its OEMs, such as 3Com, to provide all the communications services under Netbios. They see most of the LAN Manager revenue coming from OEMs, so they are not counting on this becoming a full-blown product,” Clarke says.

Conversely, IBM wants to get away from file service as it moves into Systems Application Architecture, Clarke says.

The reason we're talking about IBM here, and not Novell, is that Novell, Banyan and others will follow the standard as set by IBM — not Microsoft.

Rude awakening ahead?

Clearly, Microsoft is facing an uphill battle. Clarke is not alone when he suggests that “Microsoft will not be the champion they think they are going to be” in the network software market.

But don't think Novell is heading for a TKO. While competitors agree that Novell has done a good job of fulfilling a need in the low end of the market and has benefited until now from its close relationship with IBM, they doubt that corporate America will see Netware as the answer to its standards prayers. Microsoft has an iron grip on the Fortune 1,000 desk top, and company devotees are more likely to consider a defection to a systems vendor such as Digital Equipment Corp. than to an independent PC networking vendor.

Meanwhile, the prefight hype keeps building. Will Novell get respect from the corporate decision makers? Can Microsoft leverage its relationship with software developers to transition, along with its users, from the single-user to multiuser world? Stay tuned.

Keefe is a *Computerworld* senior editor, networking.

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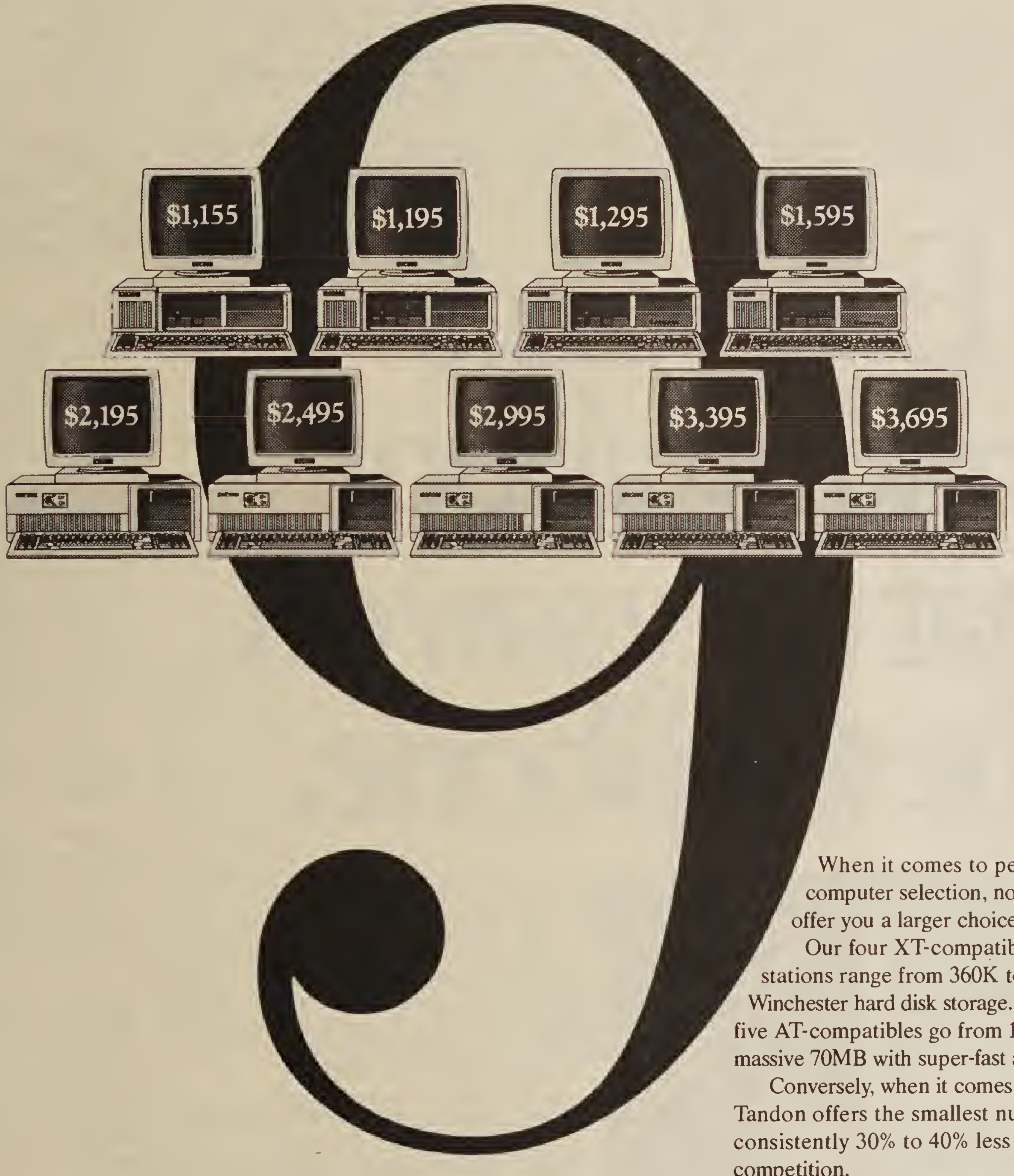

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Local-area network hardware

Itron, a division of Infotron Systems Corp., has announced the **Commix 32**, an intelligent table-top data switch for local-area communications and peripheral sharing.

The Commix 32 is said to allow any personal computer user to access any other PC, peripheral or host computer port using serial communications software. From a PC or terminal, Commix 32 can be accessed using the AT modem protocol for connection request. Asynchronous format conversion is provided.

Commix 32 is offered in an initial 16-channel configuration and can be upgraded in four-channel increments up to 32 channels.

Commix 32 is priced from $2,595.

Itron, Building 116, 130 Gaither Drive, Mt. Laurel, N.J. 08054.

Comware International has announced **Comgate**, a communications front-end processor for the IBM System/36 and 38.

Comgate is said to use IBM Personal Computer AT hardware to link the System/36 and 38 computers with local-area networks, public data networks and direct-dial networks. Up to 16 peripherals may simultaneously access the minicomputer via Comgate.

Comgate provides direct attachment to public data networks via the CCITT X.25 standard. Up to two X.25 interfaces may be connected to a single Comgate; up to 16 ports of simultaneous access are supported.

Comgate is priced from $9,500.

Comware International, 3477 Rancho View Court, San Jose, Calif. 95132.

Local-area network software

Fastcomm Systems, Inc. has announced **Dcomm Link**, a communications program said to link data from remote devices and services with personal computer data base management packages.

The program allows data from any device that uses a standard RS-232C serial port to be captured and disseminated to multiple external ports. Support is provided for time-of-day activation, tracing and debugging aids and a communications macro language.

Dcomm Link works with Ashton-Tate's Dbase III Plus, Nantucket, Inc.'s Clipper, Quicksilver Software, Inc.'s Quicksilver and Fox Software, Inc.'s Foxbase Plus. It runs on IBM Personal Computers.

Dcomm Link costs $295.

Fastcomm Systems, 235 Carrol Canal, Venice, Calif. 90291.

Customer-premise equipment

Brooktrout Technology, Inc. has announced its **Fax-Mail** family of communication systems for linking personal computers and facsimile machines.

Fax-Mail systems plug into any IBM Personal Computer or compatible and allow PCs and facsimile machines to communicate worldwide over standard telephone lines. According to the vendor, the facsimile machine can accept both text and graphics images from the PC. Files can be sent to different printers or be displayed on graphics monitors. Data can be input directly from certain scanners into the PC for transmission.

Other features include automatic transmit and receive; a dial directory or automatic dialing; and the capability to store, forward and edit documents.

Fax-Mail is priced from $595.

Brooktrout Technology, 110 Cedar St., Wellesley Hills, Mass. 02181.

Links

Metaphor Computer Systems has announced the **SQL/DS Gateway**, said to allow users of Metaphor's information retrieval and analysis system to access and analyze data that resides in IBM's SQL Data System (DS).

The SQL/DS Gateway is a dedicated processor that serves as a bridge between Metaphor workstations and an IBM-compatible processor running the VM operating system.

The SQL/DS Gateway is priced from $50,000.

Metaphor Computer Systems, 1965 Charleston Road, Mountain View, Calif. 94043.

Modems/multiplexers

Anderson Jacobson, Inc. has announced the **AJ 9601-ST** V.29 modem.

The modem was designed for point-to-point or multipoint use. It provides full-duplex synchronous operation at 9.6K bit/sec. over four-wire, unconditioned leased lines. It features an automatic adaptive equalizer, front-panel programmable options and a continuous front panel numeric signal-quality display.

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SYSTEMS & PERIPHERALS

HARD TALK

Jeffrey Beeler

Info system chauvinists

By itself, no single facet accounts entirely for a diamond's beauty and worth. On the contrary, each part contributes equally to the whole. If one component could somehow be removed, the result would be a completely different stone.

The same principle applies to business information processing. Each level in the processor hierarchy — mainframes, departmental computers and personal computers — plays a role for which the other two are inherently ill-suited. Take away just one element, and the systems organism of which it formed a part changes radically and loses much of its ability to function.

Yet those who define their professional identities in terms of one class of hardware or another act as if the opposite were true.

Even worse, they declare their allegiances unthinkingly, in the manner of an article of faith or indisputable universal truth.

Two camps

One instructive way of looking at the information systems field is to divide it into two camps. Anyone even passingly familiar with computing can easily think of individuals who exemplify each.

On one side stand the personal computer bigots. For them, any system much larger than an IBM Personal Computer AT qualifies as a technological dinosaur unworthy of serious attention. Their snobbery even refracts their sense of the past. As viewed through the eyes of a personal computer bigot, modern history began with the introduction of the original IBM PC; ancient history, with the advent of the Apple Computer, Inc. Apple I; and prehistory, with Heathkit and Mits/Altair.

In short, like latter-day Ptolemies, the members of this brash and cocksure group see themselves and their own little world as the center around

Continued on page 64

Wang unleashes Tempests

BY NINAMARY BUBA MAGINNIS
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. has added two 32-bit minicomputers to its Tempest product line with the announcement of secure versions of its 1-year-old VS 5 and VS 6 systems.

The entry-level VS 5T and VS 6T are compatible with all VS software and peripherals, according to the vendor.

Tempest equipment, designed to comply with U.S. National Security Agency regulations, is targeted at users in sensitive information processing environments.

The new Wang systems incorporate extensive production and development software support, networking and communications and the ability to process data, text, voice and images interactively, Wang said.

The VS 5T and VS 6T systems do not require any special housing and can be installed in most offices without special power or air-conditioning requirements, Wang said.

The VS 5T CPU is said to support up to eight users and 16 peripheral devices.

Priced at $13,500, the system includes Wang's VS operating system; 1M byte of memory; a 5¼-in., 1.2M-byte diskette drive; I/O controllers and facilities for attaching up to 1.7G bytes of external disk storage; and four data communications lines.

VS 5T options include an additional 1M byte of memory and support for up to eight disk drives per system, including 75M- and 288M-byte removable drives.

The VS 6T, list priced at $21,500, is said to support up to 16 users and 24 peripherals.

The VS 6T includes 16K bytes of cache memory for faster processing and provides the power of Wang's mid-range Tempest VS 65T in a small system, according to the vendor.

Options include up to 4M bytes of additional memory and

Continued on page 56

UPDATE

Storage options confusing

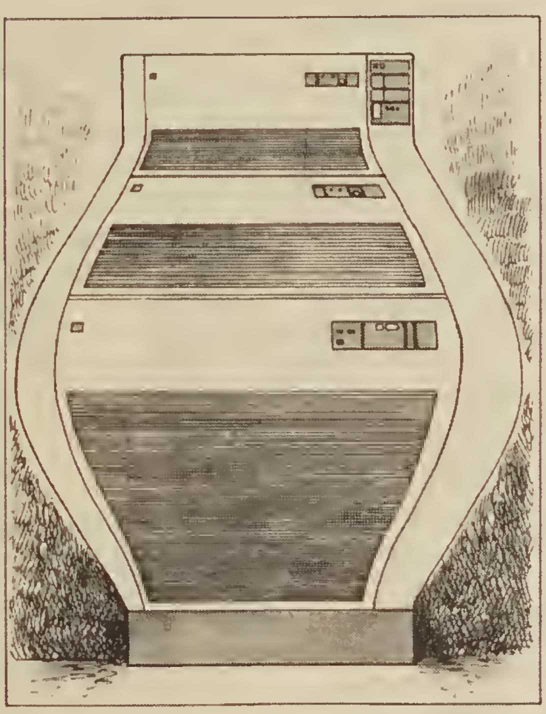
BY JAMES CONNOLLY
CW STAFF

The popularity of highly interactive applications has hardware vendors scrambling to provide the needed memory and storage. But the demand by memory-hungry applications and the competing vendor options leave some mainframe users in a quandary.

Interviews with MIS managers recently unveiled a sense of confusion in how to use the features and products offered by IBM and competing plug-compatible manufacturers (PCM). At the heart of the situation is IBM's expanded-storage feature, offered as a key advantage of the IBM 3090 mainframe over the older IBM 3080.

The confusion stems from how to utilize expanded storage, with which users still are

Continued on page 63



RICH TENNANT

Memory doubled on some VAXs

MARLBORO, Mass. — Digital Equipment Corp. has doubled the memory capacity of its VAX 8600 and VAX 8650 superminicomputers with the introduction of a higher density memory array.

The MS86-DA was designed to increase memory capacity for the 8600 and 8650 from 68M bytes to 128M bytes. The company said the arrays are intended to provide better support for memory-intensive applications such as artificial intelligence, computer-aided design, simulation, scientific modeling and large commercial data base management systems. The arrays are supported under DEC VMS Version 4.5 and console diagnostic pack Version 3.0 and DEC Ultrix-32 Version 2.0.

The array uses 1M-byte dynamic random-access memory chips mounted on a subassembly-board configuration using a double-sided surface mounting process. The company said installation of the array requires no hardware changes or modifications.

The MS86-DA has a one-year warranty, is available now and costs $36,000

Inside

- CIE Systems offers 25-MHz Motorola 68020 upgrade board. Page 58.
- EMC announces memory upgrades for Wang superminis. Page 64.
- Megatek adds 3-D graphics display. Page 66.

Intel adds low end to scientific line

BY JAMES CONNOLLY
CW STAFF

BEAVERTON, Ore. — Intel Scientific Computers, the division of Intel Corp. that sells hypercube-based scientific systems, has added an entry-level workstation to that product line.

The Sugarcube, which is available in four desktop-size models, was designed to be software-compatible with Intel's IPSC hybercube parallel processors.

The four models include a standard system for concurrent computing research, an extended-memory system with up to 18M bytes of memory for artificial intelligence and symbolic computing applications, a high-performance vector system for numeric-intensive applications and a hybrid version that combines numeric and symbolic capabilities within a single system.

'Ideal engine'

"Sugarcube systems will speed the commercialization of concurrent computing technology by expanding the number of industrial applications developers. In addition, as these turnkey applications are developed, the Sugarcube will be the ideal concurrent computing engine for OEMs," said Charlie Bishop, Intel's marketing manager.

He said an application developed on a Sugarcube with four processing nodes could be scaled to run on the larger 16-, 32- or 64-node IPSC-VX systems for production use.

Sugarcube and IPSC systems support from four to 128 nodes, with each node including an Intel 80286-based single-board computer.

A four-node Sugarcube-VX vector system reportedly performs 26 million floating-point operations per second.

The Sugarcube is slated to be available in July. The standard Sugarcube/D3 system costs $45,950. The four-node extended-memory Sugarcube-MX/D2 costs $49,950. The Sugarcube-VX/D2 with four vector nodes costs $69,950.

In a related announcement, Intel introduced an enhanced concurrent operating environment that will be bundled with new shipments of the IPSC family.

The software was designed to be faster than previous versions and to add a concurrent debugger, multiple user access, connection to Unix-based front ends and support for hybrid IPSC systems.

Minisuper software out

Floating Point release allows file striping, IBM support

BEAVERTON, Ore. — Floating Point Systems, Inc. recently began offering a new release of operating software for its M64 series of minisupercomputers.

The release, SJE Version G, is available for the M64/40, M64/50, M64/60, M64/140 and M64/145 machines.

Specific improvements include file striping, software to support the FPS P64/40 disk subsystem and P64/110 solid-state semiconductor mass storage subsystem, 16 new math routines and 198 optimized math routines.

SJE Version G also provides support of IBM standard-label tapes under IBM's MVS/SP and MVS/XA operating systems.

File striping enables a user to automatically read and write multiple disk controllers in parallel. The various models of the FPS M64 series can be configured with as many as six disk controllers, with each controller handling up to four disk drives.

Floating Point also announced its FPS/VAXBI Interface Package for both its array processor lines, the MP32 and FPS-5000 series.

The interface, making use of the VAXBI architecture, transfers data at up to 10M bit/sec.

The interface package was designed for use with all Digital Equipment Corp. VAXBI processors, from the VAX 8200 to the VAX 8800. Floating Point said the interface will be available in late summer.

In addition, Floating Point Systems introduced MPFortran, a high-level cross-compiler from a VAX to a Floating Point MP32 series-array processor. Based on Fortran 77, MPFortran will let systems designers develop high-performance applications using standard Fortran statements, and should make the MP32 easier and more cost-effective to use, according to the vendor.

Departmental integrator's machine bows

BY STANLEY GIBSON
CW STAFF

NEW YORK — Motorola, Inc. recently unveiled its Model 2616 departmental computer designed for systems integrators. The 32-bit system is part of Motorola's VME Delta series, which incorporates the VMEbus, Motorola 68020 microprocessors and AT&T Unix System V, Release 3 operating system.

"The 2616 is currently the only OEM/system integrator product that combines VMEbus, 32-bit speed and Unix System V, Release 3," claimed Noel Lesniak, systems products manager for Motorola's microcomputer division.

The departmental processor, with a 12-slot VMEbus chassis, offers disk capacity of up to 1.3G bytes and can support up to 34 users, the vendor said.

The Model 2616 is available for immediate order and delivery. It is priced from $14,000 to $25,000 in OEM quantities.

Motorola also introduced the MVSB2400, a low-power user-programmable bipolar large-scale integration gate array said to allow VME board designers to support the VME Subsystem Bus while reducing board space requirements by 20%. The VME Subsystem Bus is a local path over which processor, memory and peripheral control modules communicate to reduce bus traffic. Priced at $300, the MVSB2400 will be available in July.

Three boards premier

Motorola also introduced three boards designed for multiprocessing use: the MVME135, the MVME135-1 and the MVME136, all of which use the MVSB2400 gate array. The boards use the MC68020 microprocessor at 16 or 20 MHz and the MC6881 Floating Point Math Coprocessor.

The MVME135, the MVME136 and the MVME135-1 are available now. Prices in quantities of 100 are $3,934, $4,256 and $4,256, respectively.

In addition, Motorola introduced the MVME134, a single-board computer for Unix applications that incorporates the 16.67-MHz MC68020 processor. Available in June, the MVME134 is priced at $2,250 for an OEM quantity of 100.

Tempest

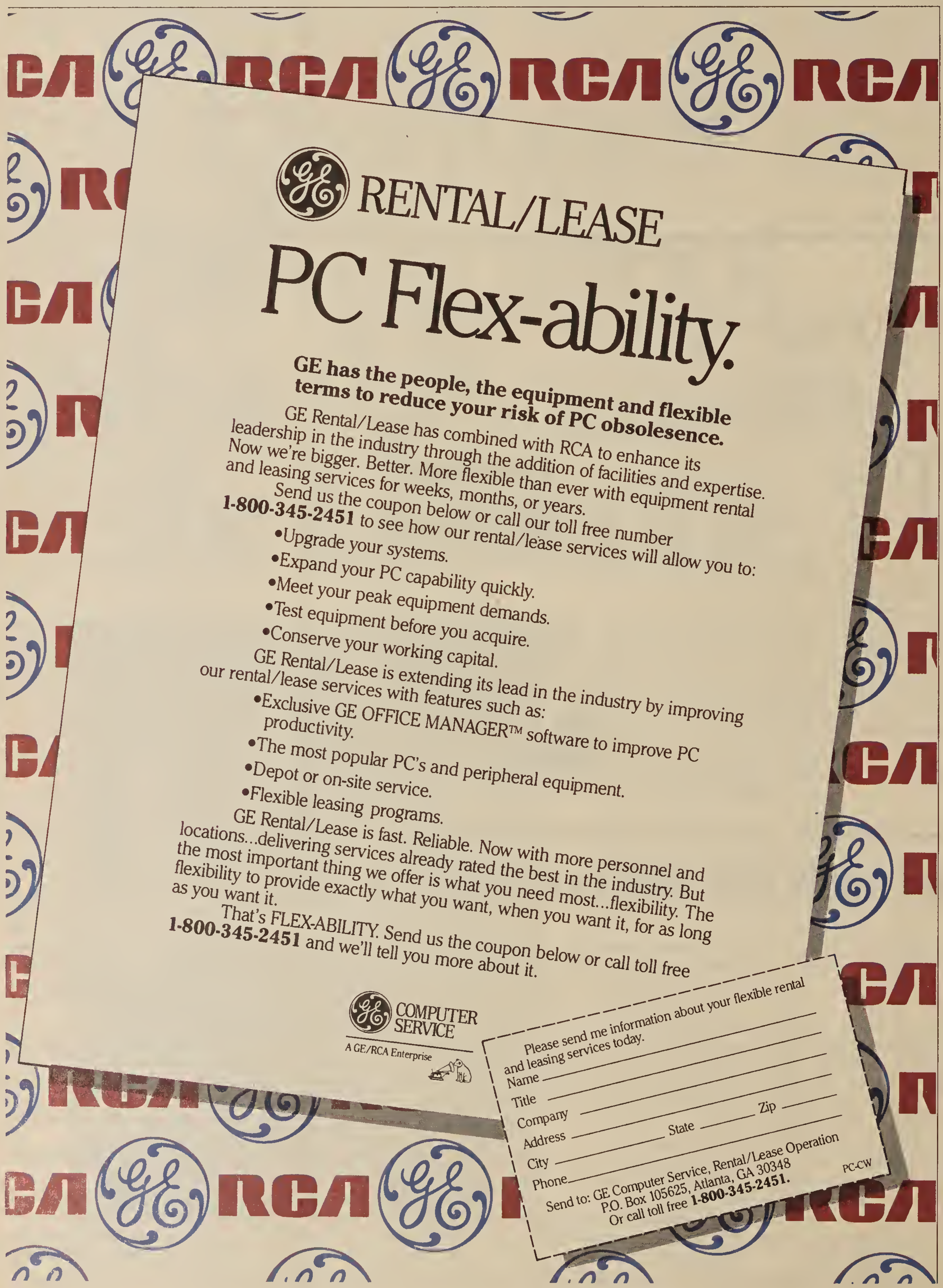
CONTINUED FROM PAGE 55

support for eight disk drives.

The VS 5T can be upgraded to the 6T by replacing the CPU board and adding a memory board, Wang said.

Wang also announced a ¼-in. streaming cartridge tape drive for system backup and two Winchester disk drives based on small computer systems interface technology.

The disk drives are said to provide increased security, greater capacity and faster throughput. The cartridge tape drive costs $4,000 and the disk drives are priced at $9,000 for the 72M-byte model and $15,000 for the 145M-byte model.



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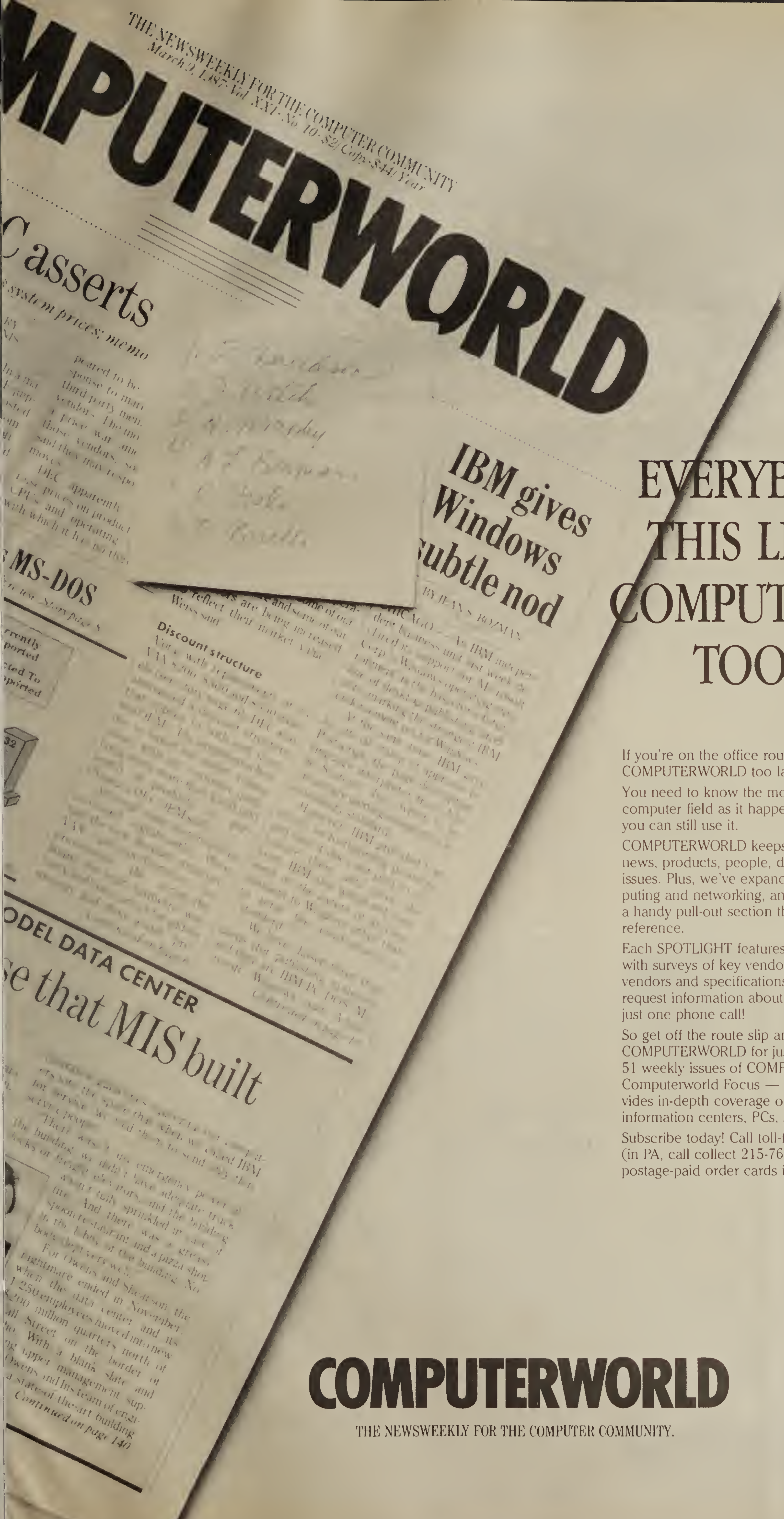
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Board allows upgrade to 25 MHz

IRVINE, Calif. — CIE Systems, Inc., a subsidiary of C. Itoh Electronics, Inc., has introduced a kit designed to upgrade its CIES/680 series of multiuser business systems to 25 MHz.

The Turbo/25 CPU board reportedly allows a retrofit of existing CIES/680 computers or can be configured into a system running the company's CIES/Pick or RM/COS.

According to the company, there is no need for modification of users' existing application software.

The Turbo/25, which is built on a 25-MHz Motorola, Inc. 68020 microprocessor, is said to have the ability to provide throughput and performance gains ranging from 50% to 125% when it is installed in a CIES/680 using an Intel Corp. local bus-extension memory architecture that has either a 10-MHz Motorola 68000 or a 16.7-MHz 68020.

"Our dealers can not only configure a C. Itoh system with disk, memory and ports to match an application, they can now select from several processors to optimize performance," claimed Warren Blossom.

Blossom is vice-president of C. Itoh's computer systems group.

The Turbo/25 is scheduled for availability in July. It reportedly will carry a price tag of $13,995.

Icon concurrent Pick bows

OREM, Utah — Icon International, Inc., a manufacturer of 32-bit multiuser systems, has announced a third concurrent operating system — Pick Systems, Inc.'s Pick — for its MPS020.

The MPS020 reportedly now provides concurrent support for Pick, which is Icon's version of Unix.

In addition, the product is said to provide concurrent support for Microsoft Corp.'s MS-DOS 3.1.

The MPS020 is a family of parallel processing computers that feature a minimum of three Motorola, Inc. 68020 microprocessors, according to the vendor.

Icon claimed the MPS020 processes up to three million instructions per second.

The company said the system architecture allows all three operating systems to run concurrently while sharing resources such as disk drives, printers and terminals.

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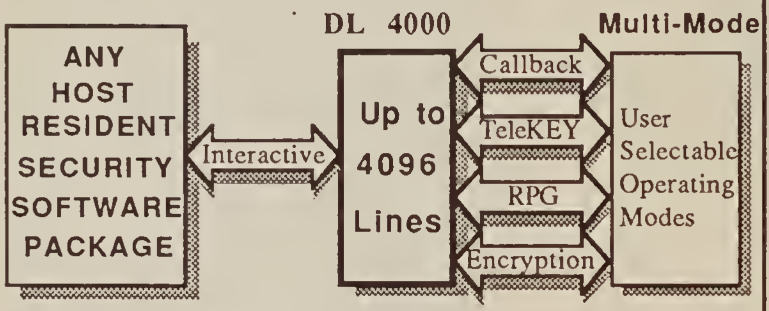
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Financial Technologies International, Inc.

Masscomp adds CPU support

WESTFORD, Mass. — Adding support for additional CPUs and a floating-point accelerator, Masscomp has enhanced its 5000 family of scientific computers.

The company announced that its MC5600 system now supports a third CPU. In addition, the MC5600 and MC5550 now support an Intel Corp. multibus expander box, have a 15-slot option with power supply enhancements, the company's FPA-2 Lightning Floating Point Accelerator and a choice of data acquisition modules.

Masscomp also announced a Disk Performance Accelerator, which was designed to allow 278M-byte disks to run at 2M byte/sec. within a cylinder, and new versions of its Data Acquisition Control Software.

The company also said third-party software recently ported to the 5000 family includes Verdix Corp.'s Verdix Ada Development System and Franz, Inc.'s Extended Common Lisp.

Drive ups DEC security

MILPITAS, Calif. — Systems Industries, Inc., a third-party supplier of Digital Equipment Corp.-compatible peripherals, has introduced a small-form-factor disk drive designed to be removed to secure places such as vaults and cabinets.

The Quick Disconnect System is targeted at DEC sites dealing with sensitive data. The drives are available in a 5¼-in. package with 320M bytes of formatted capacity.

The drive is slated to be available this month. A two-drive system in a 19-in. rack ranges from $16,400 to $19,400.

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Storage

FROM PAGE 55

experimenting, and how the 2-year-old option will develop in relation to IBM offerings such as cache controllers. At the same time, the PCMs are answering with their own memory/expanded-storage/cache combinations and with repositioned solid-state storage devices that were once intended for work loads now handled in expanded storage.

"We are just watching to see what IBM will do with it. We see it right now as a possible paging device that we might need somewhere down the road, but not yet. We really just haven't had the high paging need so far," says Howard Campter, director for Ashland Oil, Inc.'s data center in Lexington, Ky.

Michael Sims, vice-president of information systems at Conrail in Philadelphia, adds, "The problem most people must look at is what they can do with expanded storage without understanding what IBM is going to do with the operating system."

Expects new version

Sims, who runs a major CICS application on an IBM 3090 Model 200 with expanded storage, says he expects a new version of IBM MVS/XA in 1988 or 1989. He says the version, due about the time Conrail plans to make its next major hardware decision, might shift tasks from I/O devices to the operating system and vice versa. For example, whether jobs such as managing shadow files run in memory could be a key as users decide whether they need expanded storage, Sims explains.

However, IBM officials say they find no confusion. "I deal with lots of customers, and they seem to understand it very well. Those customers who have it installed on their 3090s are realizing significant benefits. Those customers who do not yet have it installed on their 3090s are looking at expanded storage and the recent software announcements for their specific applications environment," says James Hill, manager of data systems support for IBM's Information Systerns and Storage Group.

IBM introduced expanded storage with the 3090s in 1985. The company has enhanced the feature several times by increasing its capacity and extending it to lower end 3090 models.

Expanded storage is a configuration of 1M-bit chips tied to memory — what IBM calls central storage — by the system bus. The 3090s support 32M bytes to 256M bytes of memory. Users can add expanded storage ranging from 128M bytes on the low-end Model 150E to 1G byte on the Models 400E and 600E.

PCMs Amdahl Corp. and National Advanced Systems Corp. (NAS) offer their own versions of expanded storage. Amdahl partitions portions of up to 512M bytes of main memory in its 5890 mainframes as expanded storage. NAS says it will offer main memories of 2G bytes in AS/XL mainframes by year's end and 1.9G bytes of expanded storage by mid-year.

Amdahl, NAS and peripherals vendors Memorex Corp., Intel Corp. and Storage Technology Corp. also market solid-state storage devices. Those devices are boxes of memory chips connected to CPUs through I/O channels and usually equipped with battery and disk backups. The devices, on the market for six years, emulate IBM 3380 disks but have much faster access times because of the advantages of electronic storage over mechanical devices. Solid-state storage device capacities range up to 2G bytes.

Chilton Corp.'s Frazier

Only expanded storage

But IBM elected to offer only expanded storage. "Expanded storage was chosen for several reasons. Price and performance were two of the reasons, in conjunction with growth and a balanced systems offering. The larger processor storage sizes that are possible with expanded storage allow us to provide performance similar to larger central storage at better price/performance," IBM's Hill says.

IBM charges $405,000 for 64M bytes of expanded storage and $540,000 for 64M bytes for central-storage upgrades.

In contrasting the performance of expanded storage with I/O devices, whether cache controllers or the PCM solid-state storage devices, IBM senior programmer Gary King observes, "When a user references a page on an I/O device, it takes about 30 milliseconds to get it into the processor's high-speed cache to be used. With expanded storage, it takes 75 microseconds to get it into cache; and that is much, much faster."

King says some customers realizing the greatest benefits from expanded storage are those in environments with large numbers of address spaces, such as IBM's MVS/TSO, VM/CMS and Cadam; those with large virtual-address requirements, such as engineering applications; and those with multiple subsystems, including IBM's IMS and CICS.

Most customers report they use expanded storage for paging — bringing 4K-byte blocks of instructions into the CPU to avoid frequent accesses to disk or cache controllers.

Jack Knowlton, software manager for Allied-Signal Bendix Test Systems in Teterboro, N.J., reports, "We are using it for its designed intent, which was paging. We were paging at 500 to 600 page/sec., and it really was choking our I/O subsystem at a time when we were bringing up some production IDMS systems. We installed a Model 200 in October 1985 and have never seen the rate for local devices go above 1 page/sec."

Knowlton says his company, which runs Cullinet Software, Inc.'s IDMS data base management system, has a Model 200 with 64M bytes of memory and 128M bytes of expanded storage that soon will be upgraded to a 3090 Model 400E with an additional 128M bytes of expanded storage.

Conrail's Sims says his organization has expanded storage on a Model 200 running a constantly updated CICS application tracking movement of freight cars throughout the railroad system. "It's a high transaction processing application, which we have tried to keep sensitive to response times," he says. "Basically, we have it because the application we are running is rather large, and it is all co-resident. It makes sense for us in our specific application."

Competitors' capacities

	Main Memory (bytes)	*Expanded Storage (bytes)*	*Solid-State Storage (bytes)*
IBM	256M	1G	NA
National Advanced Systems Corp.	2G	1.9G	2G
Amdahl Corp.	512M	512M	512M

CW CHART

An MIS manager who asked not to be identified reports that he uses expanded storage to eliminate paging. He says programmers have no involvement in assigning data to expanded storage rather than main memory. He also uses Storage Technology 4305 solid-state storage devices to support VM paging and IMS load-library management on IBM 3081 mainframes.

Paging was a role at which the PCMs aimed solid-state storage devices for several years and in which many customers still use the devices. But now the PCMs are redirecting their efforts toward storage of volatile data rather than instructions.

"One knock against expanded storage when it came out was that it wasn't big enough. That is something Storage Technology used against them," reports Steve Josselyn, an analyst specializing in user issues with International Data Corp. (IDC), a Framingham, Mass.-based market research firm. But IBM's growth of expanded storage has eased those concerns, he adds.

Dave Mitchell, manager of computer operations for Chevron Corp. in San Ramon, Calif., reports his company has used Storage Technology and NAS solid-state storage devices for paging and swapping under VM and MVS for several years. Now Chevron also does VM paging on a Model 200 with 128M bytes of expanded storage.

Mitchell says of the devices, "We are doing paging and swapping, so there is no updatable data. It is strictly used by the operating system."

Another manager observes that he uses a solid-state storage device for application files and paging. "We are kind of atypical in that we do use some of it for paging, but we use the majority of it for application files," says Ed Frazier, vice-president of data center support for Dallas-based Chilton Corp.

Chilton has used Memorex solid-state storage devices for several years. "We are a plug-compatible mainframe shop with Amdahl hosts and mostly Memorex peripherals. Amdahl makes available more memory that you can partition as expanded storage. However, we haven't chosen to go that way," Frazier says. By placing two I/O-intensive disk files on the devices, Chilton improved the task-residency time — the time from when a transaction enters the system until it exits — by 40%, from half a second to three-tenths of a second.

But he warns solid-state storage devices are not meant for everyone. "Quite frankly, you have to find a niche application. It has to be a volatile application with a high access rate. Folks heavily into performance tuning will find an opportunity for a device," he says.

A spokesman for Amdahl reports the company is offering solid-state storage devices, which Amdahl calls Electronic Direct Access Storage (EDAS) products, where battery backup is important.

Dennis Stein, director of processor system marketing for Amdahl, cites the example of linear data sets used for indexes into relational data bases and other files requiring "real quick lookups" before bulk data is retrieved.

Stein says the choice of where to store data or instructions — in main memory, expanded storage, EDAS, cache, disk or tape — must be based on how the data fits into a hierarchy based on importance and access frequency. "In a perfect world, every piece of data would be accessible in an nsec. The reality is that from cost and other perspectives, that's not practical," he says. Operating system code can present bottlenecks if it is far from the processor. The code belongs in main memory, Stein says, explaining that is a reason for Amdahl's offering larger main memories. Tracy Hawkey, solid-state disk product manager for Memorex, says typical uses for a solid-state storage device would be maintaining data base indices, spool files and security files. But he also says Memorex finds itself selling the devices against expanded storage.

Stein says the advantage of memory over expanded storage is not just the bus speed but also the fact that the path from expanded storage to the CPU is still through main memory.

Decision hurt market

Stein also maintains that IBM's decision to offer expanded storage but not solid-state storage devices hurt the device market because the technology lacks IBM's endorsement.

He adds, "I don't think anybody was waiting to relieve all of their problems the day IBM announced expanded storage. I think, quite frankly, that people don't understand what expanded storage is for. IBM is trying to create sort of an aura around expanded storage, but the reality is that they haven't given you a reason to use it."

IDC's Josselyn says, "People are learning how to use expanded storage. Everyone was ingrained with the mentality, before, of going out to disks.

"Now," Josselyn continues, "it is hard for IBM to break in with expanded storage. But people who have bought it are using it."

Hawkey says disk and battery backups on solid-state storage devices are changing the way the PCMs market the boxes. He says, "Storage Technology first offered theirs as a paging alternative. Winchester disks and battery backups are helping people to put on more volatile data."

Hawkey says he foresees capacities of the devices soaring past the 2G-byte level to 8M bytes as 1M-bit chips replace 256K-bit chips. Meanwhile, IBM will continue to enhance expanded storage in increments, rather than through major breakthroughs, Josselyn predicts.

Continued on page 64

Chauvinists

CONTINUED FROM PAGE 55

which the rest of the systems universe revolves. Call them microcentric.

On the other side stand the mainframe chauvinists. Many MIS executives have made great strides in responding to the profound changes that personal computing have brought to their systems environment.

But others have been slow to adapt. To say that most of the laggards are actively resisting micros is probably an overstatement. However, neither do they wholeheartedly accept the machines or know how to cope with them effectively.

Although they may welcome PCs as a boon to end-user productivity, mainframe chauvinists also fear the products as a threat to their control. In them churns a secret longing to return to the good old days, when glass-enclosed data centers were the undisputed suns about which all systems activities obediently orbited. Call them macrocentric.

Tunnel vision

Alike only in their shared tunnel vision, personal computer bigots and mainframe chauvinists are often woefully ill-informed about even the basics of each others' domains. But their deficiencies go far beyond simple ignorance, which can be readily corrected, given a sufficient willingness to learn.

What makes personal computer bigots and mainframe chauvinists so lamentable is their narrowness of mind, their unreasoning belief in the innate superiority of their own specialties and their stubborn refusal to acknowledge virtues in others different from themselves. Like most other forms of prejudice, theirs is a habit that is hard by nature to break.

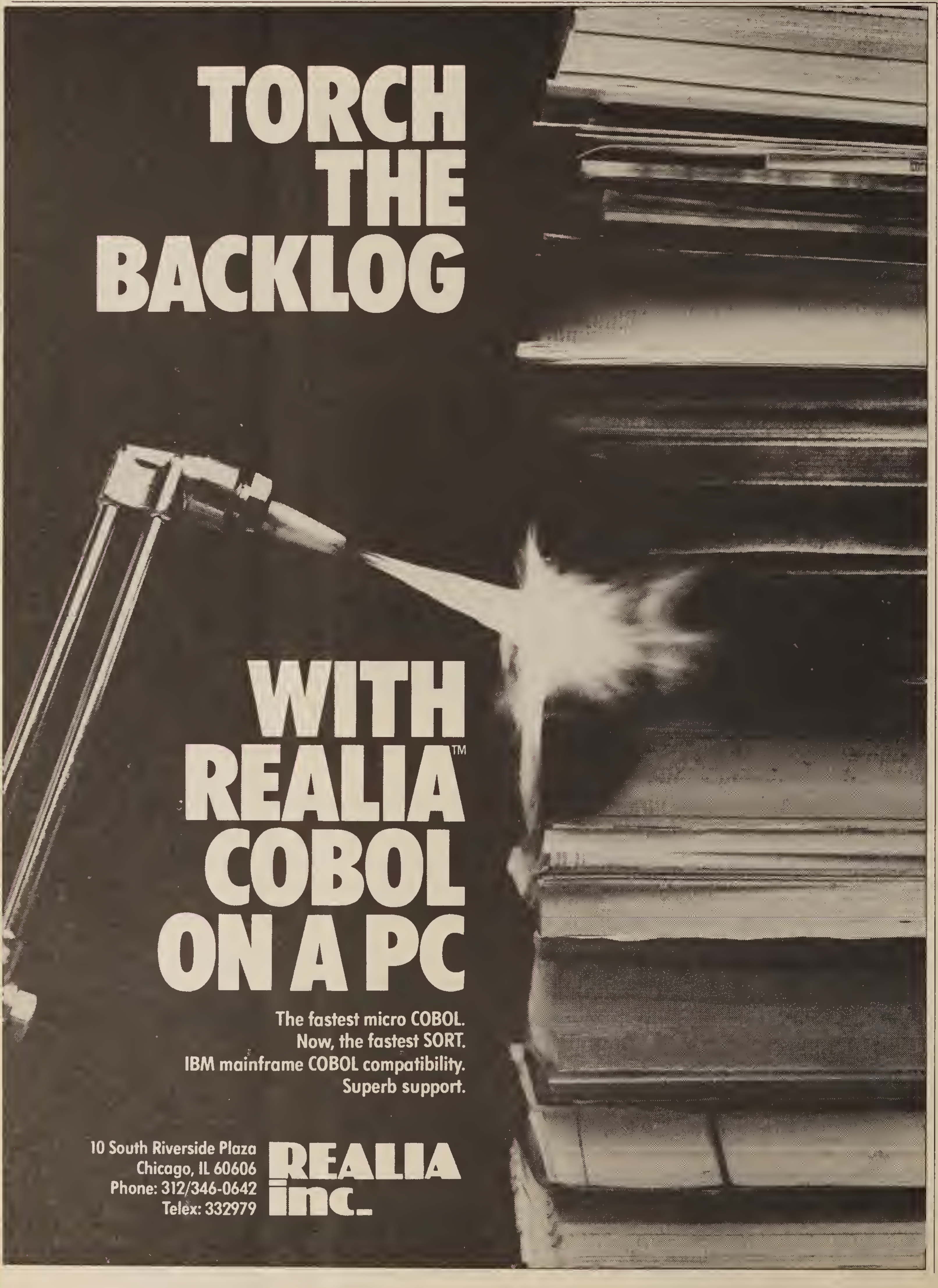
In the early 1980s, when PCs were still a novelty in the corporate world and usually operated independently of the larger classes of systems, their parochialism might have been understandable, maybe even unavoidable. But today, their attitudes are outmoded and indefensible.

During the past few years, users and vendors have integrated mainframes and micros to the point where the two are no longer possible to treat individually. Such is their degree of inseparability that neither side can claim true mastery of its own discipline without gaining at least minimal competence in the other.

But the idea of ambidexterity in information systems is utterly foreign to confirmed microcomputer bigots and mainframe chauvinists.

The plain fact of the matter is that host processors and desktop machines are merely different facets of the same gemstone known as the information systems enterprise. The sooner that small and large systems buffs accept that inescapable truth, the better off the industry — and everyone in it — will be.

Beeler is a *Computerworld* West Coast correspondent.



EMC boosts memory of VS 7000

NATICK, Mass. — EMC Corp. has introduced memory upgrades for Wang Laboratories, Inc. superminicomputers, including the VS 300 and the recently announced VS 7000 series.

The upgrades are available in 4M- and 8M-byte increments and utilize 256K-bit memory chips.

EMC, which manufactures memory products for superminis and minicomputers from several vendors, claimed a 25% price advantage over Wang's memory offerings.

EMC's 4M-byte memory board costs $19,200. The 8M-byte board costs $38,400.

Storage options

CONTINUED FROM PAGE 63

Where IBM's Extended Architecture (XA) allows memory capacities of 2G bytes, expanded storage eventually could provide 16 terabytes of storage because each 4K-byte page in expanded storage uses only one address in memory, IBM's Hill says.

But while incremental growth is occurring, users such as Conrail's Sims and Ashland Oil's Campter are watching what IBM is doing to let customers do more with expanded storage.

In recent months, new versions of CICS and MVS/XA have taken advantage of expanded storage, IBM officials claim.

Josselyn says that in recent months, enhancements to IBM products such as JES2, JES3, VSAM and Data Facility Product have been aimed at utilizing expanded storage. He cites the example of a 1986 VSAM release, under which a mainframe's paging manager is allowed to handle linear VSAM data sets.

Sims adds that he expects future operating system enhancements to rework the way the CPU reacts with controllers and with storage. He says IBM has moved more functions into memory, which could mean more work for expanded storage. However, he notes that more functions still might be shifted to controllers, which could mean off-loading tasks from the CPU and expanded storage.

In 1981, we introduced the world's most successful personal computer.

Here we go again.

Introducing the IBM Personal System/2

Jan
Feb
Mar
IBM
Personal System/2
IBM Personal System/2 Model 30 Starter Kit
IBM
Personal System/2
IBM
Personal System/2
Personal System/2
International Business Machines Corporation
Made in the United States of America
IBM
Personal System/2
IBM Personal System/2 Model 50

IBM
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International Business Machines Corporation
Made in the United States of America
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Personal System/2
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Personal System/2

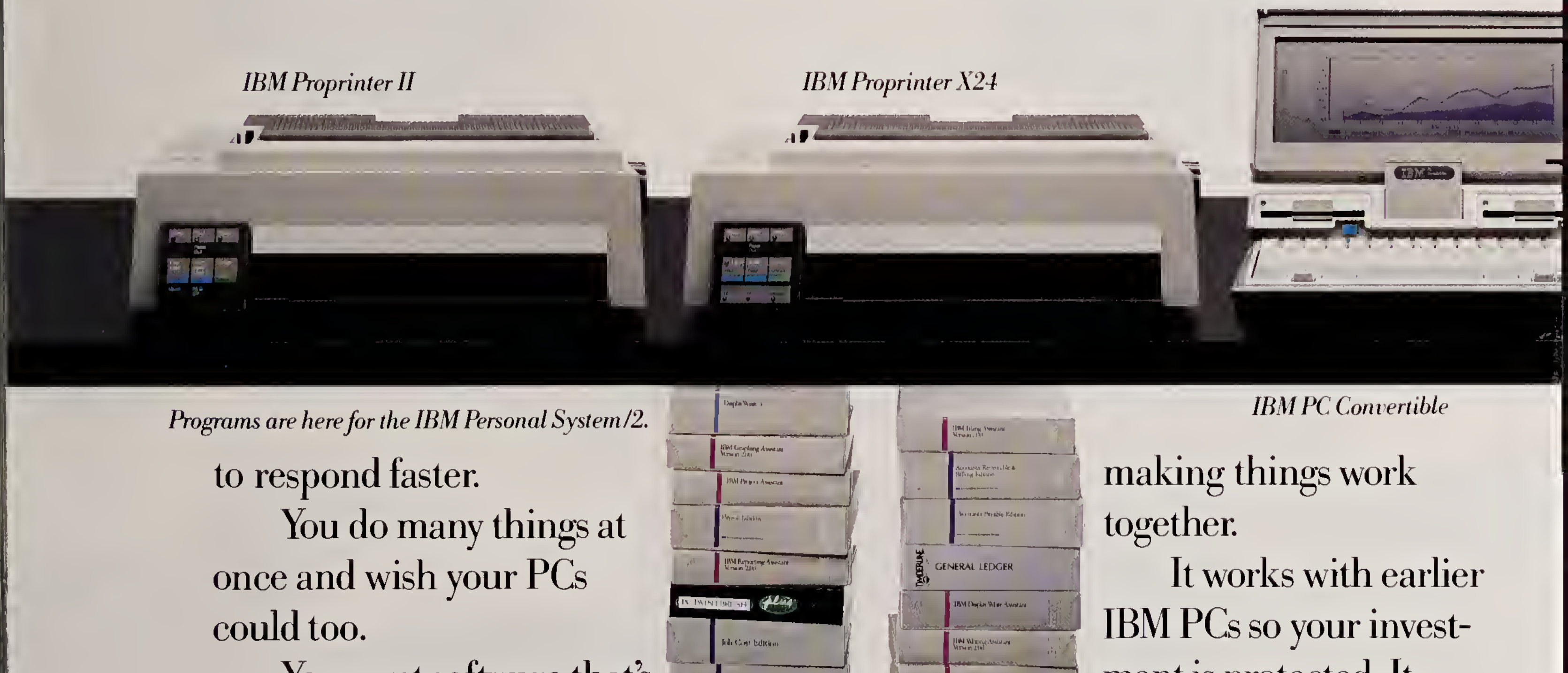
Five years ago, we sent our first personal computer out the door and hoped you'd find it useful.

We're pleased you did.

Over three million IBM® PCs have been put to work, doing everything from financial analysis to first-grade arithmetic.

Yet as PCs grew more popular, and as we kept improving them, one thing became clear. You needed more.

You're in a hurry, so you want PCs to respond faster.


IBM Proprinter II

IBM Proprinter X24

IBM PC Convertible

Programs are here for the IBM Personal System/2.

You do many things at once and wish your PCs could too.

You want software that's more powerful, but also easier to use.

You'd like more color.

You're eager for your systems to communicate with other systems.

You want improved reliability.

And you want all this without obsoleting your investment in equipment, software and training.

So there was only one thing we could do: create a whole new system for personal computing.

The new IBM Personal System/2.™

Its heart is a new line of hardware and software, but its soul is bigger; new technology, of course, but also a new "balanced system" approach for making things work together.

It works with earlier IBM PCs so your investment is protected. It works with larger IBM systems so your future growth is protected. It works for business and education, for professional people of every stripe.

The next generation in

The new systems.

There are four models of the new IBM Personal System/2: Models 30, 50, 60 and 80, with a choice of configurations, with new design and components, and built not merely for speed but for well-balanced performance.

IBM Personal System/2 Model 30

Model 30 is about 25% smaller than the IBM PC, does many jobs more than two times faster than the IBM PC XT,™ and comes with 640KB of memory and a 20-megabyte (MB) fixed disk if you want one. Much of what used to be optional is now standard, and improved. Graphics are spectacular. So is the value. Model 30 offers exceptional performance for the money.

Model 50, with its 80286 microprocessor, is an even bigger step forward. It has new architecture (as do the even more powerful models) that breaks old barriers. One megabyte of memory is now standard, and there's plenty of room for more. Its graphics (again, in common with the larger models) are another dimension beyond. And it finishes many jobs significantly faster than the IBM Personal Computer AT.®

IBM Personal System/2 Model 50

Model 60 takes up less space on your desk because the computer itself doesn't sit on your desk, but rather, beneath or beside it. Equipped with a 44 or 70MB fixed disk, up to 15MB of memory and expanded expandability, it's a system for serving a very busy person, and can be a file server for

personal computing.

other busy persons.

Model 80. For everyone who's been waiting to experience the real power of the 80386 microprocessor, it's not just *in* this computer, we built this computer around it. Available this summer, Model 80 is a 32-bit system that does jobs up to three and a half times faster than the IBM Personal Computer AT. Up to 2MB of memory are standard, and fixed disks can be 44, 70 or 115 megabytes big. Or with two fixed disks, 230 megabytes huge. Computers this capable, and connectible, used to fill whole rooms.

The rest of this booklet tells more about the IBM Personal System/2. And how, all together, it can help make your professional life easier, more productive, and more rewarding.

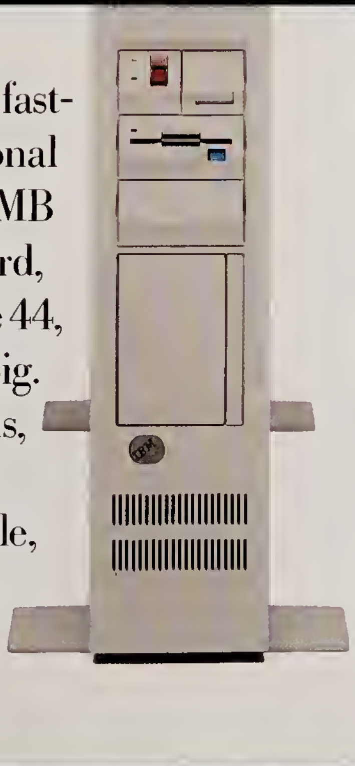
The new performance.

You'll find new architecture, new integrated design and new operating systems that together lift raw power to higher levels of true performance, while cost goes the other way.

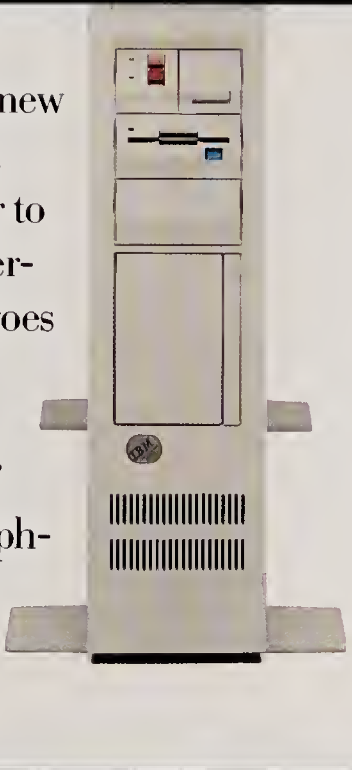
The new graphics.

You'll see new graphics, all standard, that redefine the words

IBM Personal System/2 Model 60



IBM Personal System/2 Model 80



"colorful" and "sharp." And new displays that give your programs a heightened sense of reality.

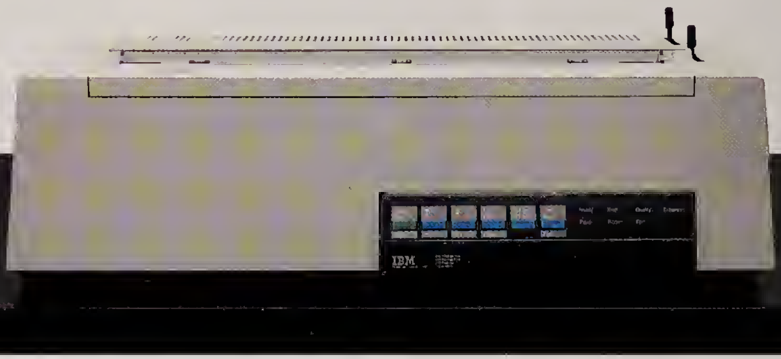
The new connectivity.

There will be new avenues for sharing information; new match-ups of hardware and software that shorten the distances and widen the roads between PCs, minis, mainframes and people.

The new media.

You'll see rugged diskettes that are half as big, but hold up to twice as much as floppies did. Plus low-cost devices for transporting your data from one generation into the next. And a new IBM 200MB optical disk drive.

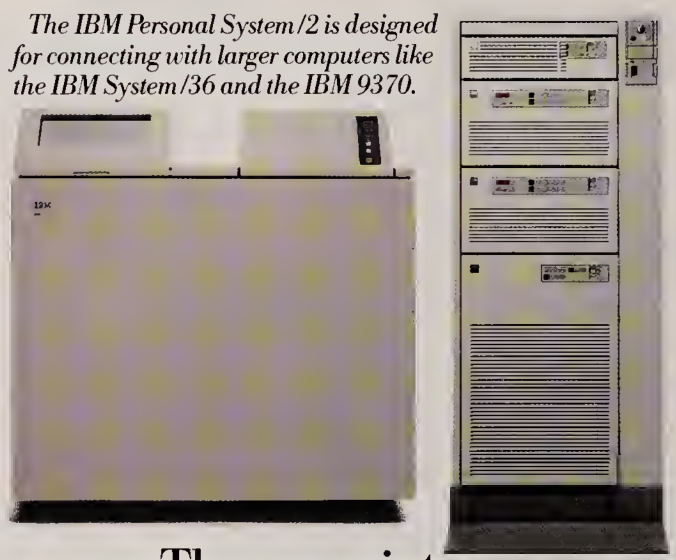
IBM Proprinter XL24


IBM Quietwriter III Printer

The new solutions.

You'll discover new ways to solve problems; ideas about choosing not just software or hardware, but software, hardware and support in balance.

The IBM Personal System/2 is designed for connecting with larger computers like the IBM System/36 and the IBM 9370.



The new printers.

You'll see an expanded family of personal printers that fills just about any need, from economy, to speed, to the fussiest levels of document quality.

The new support.

And because it's not just what you buy but where you buy it, you'll learn how we've been working closely with the people who sell the Personal System/2 to create new levels of dealer support.

So, it's power you wan

The new performance.

It's tempting to size up computers by the numbers, but in the IBM Personal System/2, real performance exceeds the sum of its parts.

Components were designed not just to coexist, but to cooperate; within each system, and within your total computing environment.

The IBM Personal System/2 takes up less space on your desk. The on/off switch is on the front, and monitors tilt and swivel.

So your software runs faster, and your system is more reliable.

Extras aren't extra.

You could expand earlier IBM PCs after you bought them, but the Personal System/2 is expanded before you even open the carton. Things that used to cost extra don't anymore.

Advanced graphics, parallel and serial ports, a port for pointing devices, and diagnostics are included.

And new IBM technology—our one-million-bit memory chip, high-density logic circuits, and integrated "planar boards"—is sending performance up, and costs down.

Paths to the future.

Models 50, 60 and 80 share a design that's new to personal computing. Technically it's described as parallel bus architecture (we call it IBM Micro Channel™), but think of it as a highway.

Our first PCs were built around a two-lane street. Usually that's enough, but sometimes there are traffic jams. Your sales figures might have to stand on the corner while your mailing list goes by.

The new system is like an expressway. There are more lanes open t?

in both directions. The ramps are more smoothly paved, and signals are better synchronized. So data can flow more freely.

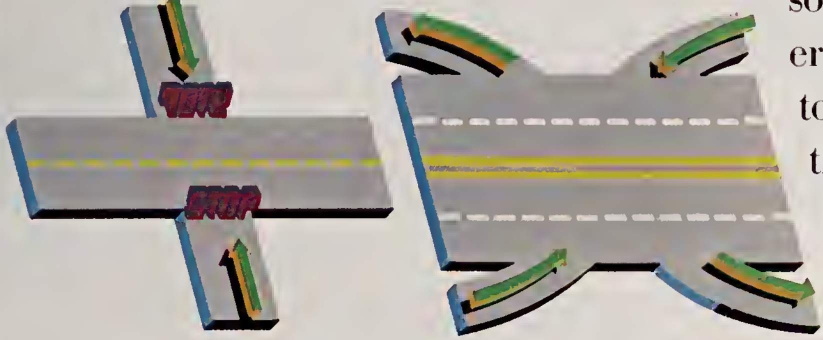
This is what the 286 and 386 chips have been waiting for. A highway to match their horsepower.

The new operating systems.

The Personal System/2 is being introduced with a new IBM PC DOS Version 3.3 that lets you tap into the new systems immediately, and works with all previous IBM PCs as well.

The IBM Personal System/2 Model 80 was created to unleash the power of the 80386 microprocessor.

There's also an IBM 3270 Workstation Program that, with PC DOS Version 3.3, helps the Personal System/2 connect with mainframes, supports more memory, and lets you run multiple applications.



In earlier PCs, data sometimes had to stop and wait. New IBM Micro Channel architecture is more like an expressway. Data flows more freely.

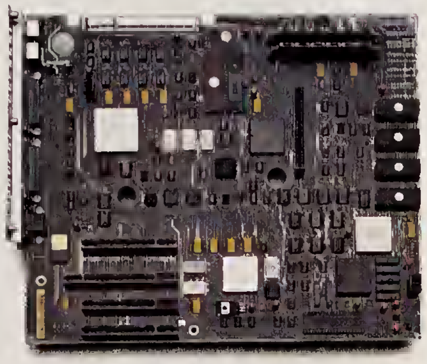
But much more is coming.

A new IBM Operating System/2™ will run on Models 50, 60 and 80. Available later on, its development is being carefully timed so that everyone involved—software makers, our dealers, you—can take full advantage of its power as easily as possible. It will do everything our existing PC DOS does (in fact, they'll get along beautifully), but it also will bring major advances.

Memory. Our new systems offer up to 16 megabytes' worth, and Operating System/2 will make these vast resources easier to access.

Multi-tasking. With IBM Operating System/2, you won't have to be a "power user" to understand how to run several programs at once. Multi-tasking will become a routine experience.

Software. Together with the new architecture and more memory, Operating System/2 will give software developers new freedom to create programs that are more powerful, better looking, and easier to use than ever before.



IBM Personal System/2 "planar boards" have many standard features that used to be options.

A bigger idea. Operating System/2 is also part of another new idea, called IBM Systems Application Architecture.

Its goal is to bring the world of IBM computing closer together; to provide a greater consistency in look, function and feel—for systems, for software and for people who use them. IBM Operating System/2 is the first step for personal computing in this promising new direction.

It's like having 256,00
in one box.

The new graphics.

Back in the dark ages of personal computing, the world was ruled by numbers and words. Graphics were a nicety, but rarely a necessity.

Welcome to the Renaissance.

The IBM Personal System/2 has a talent for graphics that's dazzling.

Each new system can paint up to 256 colors on the screen at once, drawing from an incredible palette of over 256,000. And not one of those colors costs a penny extra.

The IBM Personal System/2 Monochrome Displays 8503.

Even in monochrome, things aren't monotonous. There can be up to 64 shades of gray for new dimension and contrast.

And the images themselves are greatly improved. The tiny "pixels" that create the image can now be tinier, and there can be lots more of them. Even the space between them seems to have disappeared. So pictures are

All screens in this brochure are actual and unretouched.

0 crayons

sharp and clearly defined.

Better letters.

Equally important, letters and numbers are clean-edged and precise, looking more like they're printed than projected. After a few hours with your trusty spreadsheet, you'll appreciate that.

You'll also like the non-glare viewing surface, and mountings that tilt and swivel so your neck doesn't have to.

The IBM Personal System/2 Color Displays 8512.

There are four new IBM displays, and each works with every Personal System/2 computer, all showing graphic improvements in price.

The 12″ monochrome and 14″ color displays are great for most general-purpose work. The 12″ color display is even sharper, ideal for detailed business graphics. And for design work, there's the big 16″ color display with even higher resolving power.

Your favorite programs.

Just about any program you can run on the IBM Personal System/2 will look better, and will likely be more pleasant to spend time with. Many other programs are being reworked just to take advantage of the new graphics.

But the future holds real surprises. The screens of the Personal System/2 are like a brand new kind of canvas. How the artists will use them should be something to see.

The IBM Personal System/2 Color Displays 8513.

The IBM Personal System/2 Model 50 and the IBM Personal System/2 Color Display 8514.

The future belongs to well-connected.

The new connectivity.

The earliest computers were big and costly, so people shared them.

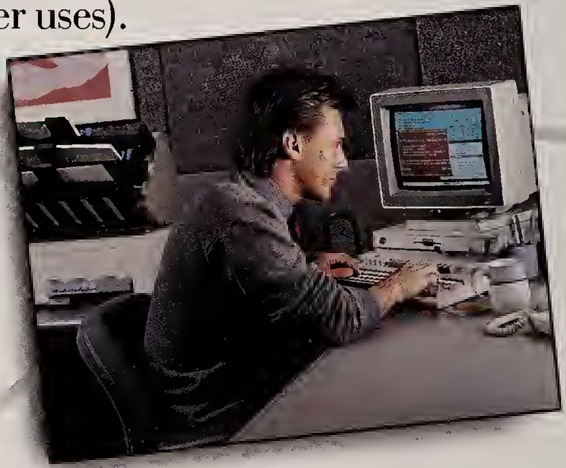
Then people wanted smaller computers just for themselves. Soon PCs were in offices everywhere. And how did people want to use them?

For sharing things. So the idea of PC connectivity was born.

From the start, the IBM Personal System/2 was designed to connect; with other IBM personal systems, with bigger IBM systems.

Each new system comes with built-in asynchronous communications (which can save you an option slot for other uses).

The managing director uses IBM 3270 Emulation and Professional Office System™ software (PROFS) for checking calendars and sending electronic mail.



An executive assistant uses IBM DisplayWrite 4 to polish up memos and reports for distribution through IBM DISOSS.

The personnel director sends bulletins using the IBM 3270 Workstation Program and PROFS.

An inventory clerk uses an inquiry to a data base to compare what's out in the warehouse with sales orders.

the

A product manager loads her spreadsheet using the IBM Token-Ring Network to access information.

So information has no trouble traveling back and forth. But the real news is what happens inside.

Going with the flow.

The new architecture in Models 50, 60 and 80 will improve the flow of traffic within the system, so when an important message comes in from corporate headquarters, it's less likely to see stop signs. And if the sender has a properly equipped IBM PC, PC XT, Personal Computer AT or IBM Personal System/2 Model 30, that's okay too—they work together.

The IBM 9370 computer stores information and provides data base management support for the business.

And as the new IBM Operating System/2 unfolds, communication will become even easier. Its multi-tasking capability will make it easier for your system to receive and store electronic mail, mainframe data, or whatever, while you're busy doing something else.

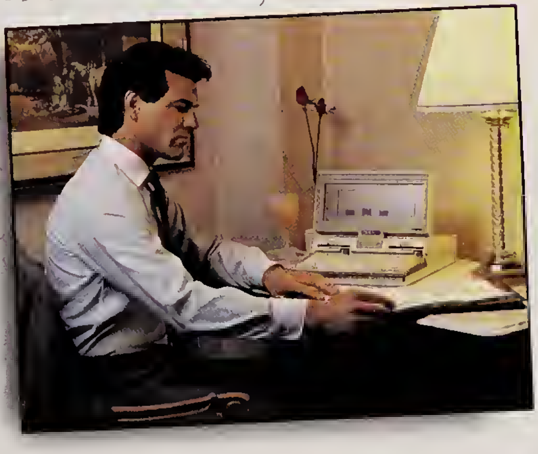
The scope of communication has been increased, too.

A wide array of local area network and connectivity products is part of the IBM Personal System/2 family, so your resources can be as broad as your needs; from the first IBM PC your company ever bought, to mid-range systems, to the biggest IBM 3090 mainframe, the lines are open.

Programmers work within the framework of IBM Systems Application Architecture to develop applications.

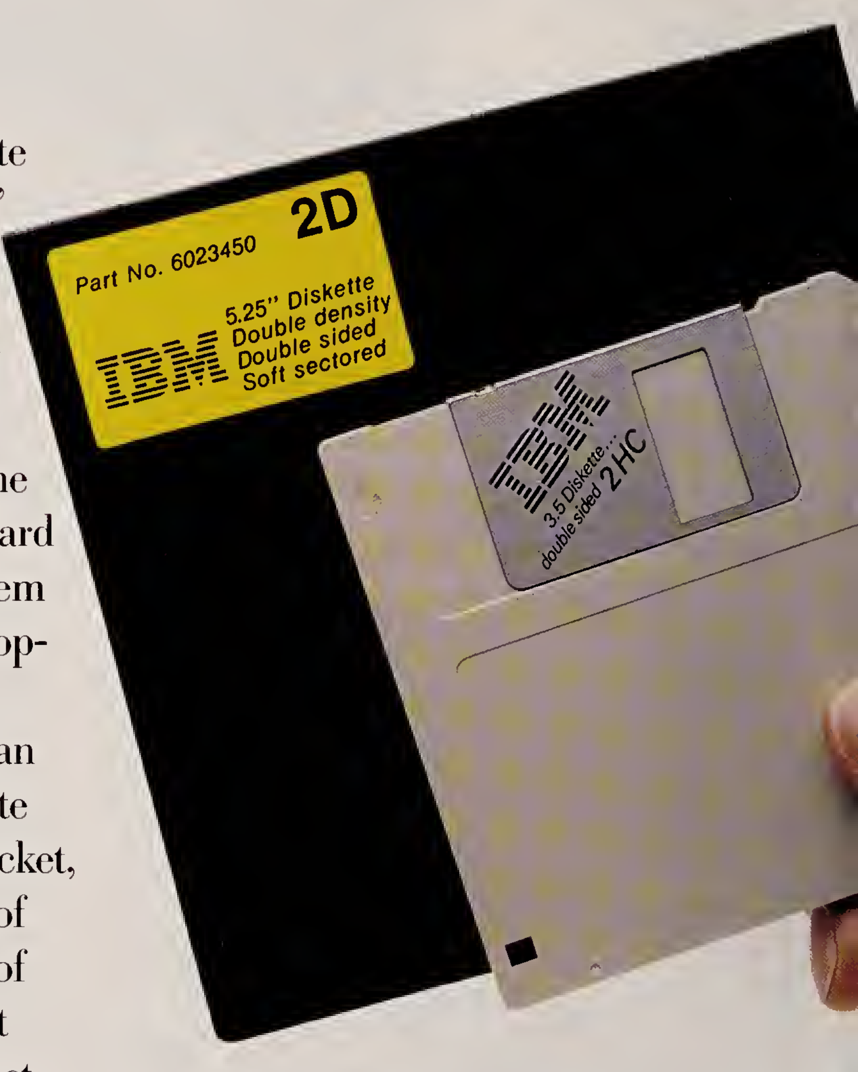
And this is just the beginning.

A design engineer uses an IBM Personal System/2 Model 80 to create a product accessing designs from the host computer.



Meanwhile, from a hotel room, a salesman uses the modem in his IBM PC Convertible to send back details of a new order.

IBM just got smaller. three quarter inches.



The new media.

The amazing 5¼″ floppy diskette can hold literally hundreds of pages' worth of memos, reports and vital statistics.

So why are we switching to 3½″ diskettes?

Because they hold up to twice the information, and they don't flop. A hard plastic case protects them from mishaps that floppies are heir to.

A simple accessory kit transports data from 5¼″ to 3½″ diskettes.

So not only can you slip a diskette into your shirt pocket, you'll have fewer of them, with more of your work all in one place. You won't have to fool around with write-protect tabs anymore, either. They're built right in.

Bridging the gap.

Very nice, you say, but what about all that work on 5¼″ diskettes?

We thought about that from the very beginning, and we're offering a number of low-cost solutions to make the transition as smooth as possible.

One is a simple cable adapter and software package that lets you send your data from an IBM PC, PC XT or Personal Computer AT to your IBM Personal System/2, then onto the smaller diskettes. Depending on how much data you have, the whole job could be over in one sitting.

It takes two 360KB 5¼″ diskettes to hold as much as one 720KB 3½″ diskette.

Also available are special IBM 3½″ and 5¼″ external diskette drives, to be there

By one and

anytime you need them, for conversions in either direction.

Software is here.

And what about software? Well, 3½″ diskettes may be new to full-sized IBM personal computers, but they're not new to personal computing.

They're used, for example, by the IBM PC Convertible. So, many popular spreadsheet, word processing, data base and other programs (from IBM and other companies) are already available on 3½″ diskettes. And software makers are working to get new releases out quickly.

Optical allusion.

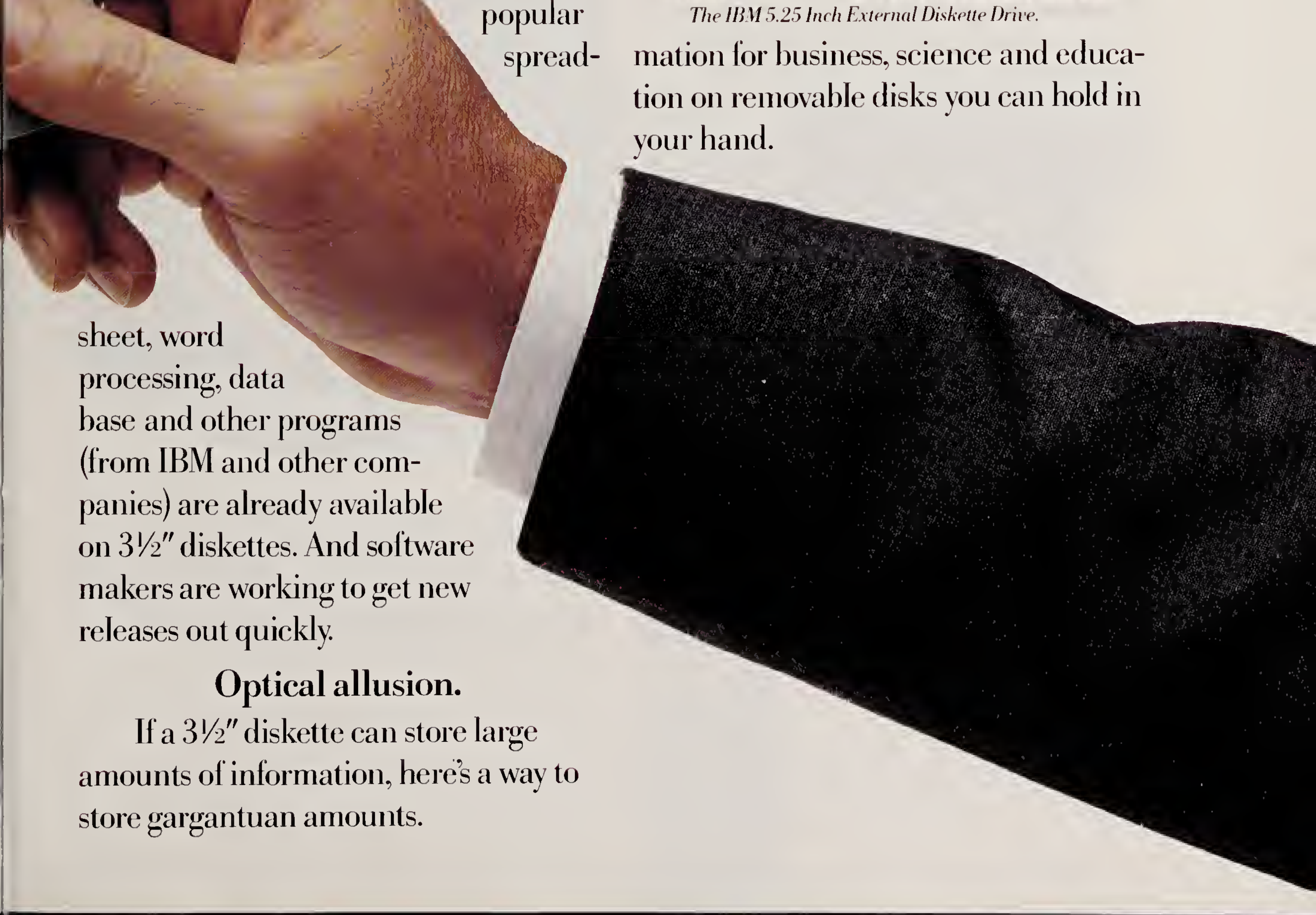
If a 3½″ diskette can store large amounts of information, here's a way to store gargantuan amounts.

We're introducing a 200-million-byte optical disk drive.

It works with all Personal System/2 computers and, with advanced laser technology, will let you build a massive library of information for business, science and education on removable disks you can hold in your hand.

The IBM 3363 Optical Disk Drive with "write-once, read-many" disks (left) and the IBM 3.5 Inch External Diskette Drive (right).

The IBM 5.25 Inch External Diskette Drive.



The solution is part o system.

The new solutions.

We sell computer systems, but that's not what you're really after.

You want the things a system can do for you.

So while we were busy developing new machinery, we were also active on the software front.

One of the first things we looked at was how you choose software.

Over the last five years, thousands of programs have been written—by us and by others—for IBM PCs. That's a good thing, and we want to keep it going, so we've continued to work with independent software companies.

IBM CADwrite Design and Drafting System SolutionPac for designers and engineers.

Getting with the program.

We're telling them about our move to 3½″ diskettes so they can convert popular programs to that size. We're showing them our new graphics so they can revise software to take advantage of them. And we're keeping them up-to-date about the new IBM Operating System/2 so they can create brand new programs with even higher levels of function.

So, popular programs like Lotus 1-2-3,™ WordPerfect® and dBase III PLUS™ will be available for the Personal System/2.

f the

Needless to say, we've also updated our popular IBM software. IBM DisplayWrite™ 4, the IBM Assistant Series,™ IBM Business Adviser* and IBM educational programs are ready to go for the Personal System/2.

The IBM SolutionPac.™

Then we looked at software from another point of view.

With so many decisions to make, so many combinations of hardware and software, choosing the right one can be confusing. Maybe you'd prefer "one-stop shopping."

IBM Business Adviser Financial Accounting SolutionPac.

So we created an idea called IBM SolutionPacs.

You'll be able to buy them from selected IBM Authorized Advanced Products Dealers.

What you'll get is a software package designed for your kind of business, with a hardware ensemble that's been matched to it, and tested. Plus a program of service, training and support.

Popular programs will be available for the IBM Personal System/2.

A wide range of IBM SolutionPacs is in the works. Among the first ones available are the Business Adviser Financial Accounting SolutionPac, a CADwrite Design and Drafting System for designers and engineers, a desktop publishing SolutionPac and a Doctor's Office Management package, as well as SolutionPacs for contractors and lawyers.

They will make buying easier, and should shorten the time between "I've got my computer system" and "I've mastered my computer system."

Of course, a big role is played by the new Advanced Products Dealers. Their new "whole-solution" training will make it easier for the two of you to assemble the best system for you.

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*ADVISER is a registered trademark of Computer Designed Systems, Inc., Minneapolis, Minn.

New power to the prin

The new printers.

Most of what shows up on your computer screen is seen by just one person. You.

The Glacier Bay Gazetteer
Projected vs. Actual Sales
Full Court Press - 4th Quarter Report
Readership Survey
BookWorm Tapes

But what comes out of your printer goes out to the world. So it has to look professional, and getting it done has to be easy; virtues that have made IBM personal printers best-sellers.

The IBM Proprinter™ and the IBM Quietwriter® Printer have earned high marks from both customers and critics.

Now our printers are even better, and we've added new members to the existing family.

The IBM Proprinter II.

What made the original Proprinter so popular was speed, versatility and convenience.

The IBM Proprinter II.

So what do you get more of in the Proprinter II? Speed, versatility and convenience.

There's now Fastfont,™ an extra-fast draft mode. Switching to "near letter quality" is faster too, because now there's a button for changing modes.

There's also a choice of typestyles, and of course you can still load envelopes from the front and put in single sheets any time you want.

The IBM Proprinter II is for anyone who wants to print text and graphics, with a printer that's fast and economical.

The IBM Proprinter X24 and Proprinter XL24.

The IBM Proprinter X24 and Proprinter XL24 are new. The "24"

The IBM Proprinter X24 with optional sheet feed.

The IBM Proprinter XL24 has a wide carriage, ideal for spreadsheets.

ted page.

stands for 24-wire technology. What *that* stands for is new levels of Proprinter quality for everything you put on paper.

Both models print letter quality text with greater detail and graphics with better density and definition. The improvement is easy to see.

So is the performance. When compared to current, best-selling, comparably priced 24-wire printers, the Proprinter X24 and Proprinter XL24 print 1½ to 2 times the draft output in the same amount of time.*

The Proprinter XL24 has a wide carriage for spreadsheet printing, and both have an optional sheet feed for added paper-handling convenience, plus FontSet,™ an option that lets you choose from 11 other typestyles.

The IBM Quietwriter III Printer.

Earlier IBM Quietwriter printers have always been easy on the ears, but the new IBM Quietwriter III Printer is even quieter and goes nearly twice as fast, printing executive letter quality text and graphics in an executive hurry.

There's new flexibility in style, as well. The Quietwriter III Printer comes with four different type fonts built in and you can combine typestyles within the same document.

If that's not enough, there are optional font cartridges that give you the freedom to use up to eight typestyles on one page.

There's also a new dual-drawer sheet feed (with optional envelope feed) that lets you use letterhead stationery for the first page of a letter, then plain paper for the rest.

No matter what level of price or performance you need, there's an IBM personal printer to fit the bill. And they fit very nicely with the IBM Personal System/2.

The IBM Quietwriter III Printer with single-drawer sheet feed.

There's also an innovative multiple-drawer sheet feed.

---

*Based on an independent evaluation using *PC Magazine* Labs Benchmark Series.

It's not just what you b but where you buy it.

The new support.

As we designed the IBM Personal System/2, we weren't just thinking about products. We also paid serious attention to how, and where, you buy them.

The IBM Personal System/2 offers so many possibilities, so many new ways to do things better, astute guidance must be there if you need it.

So we're raising the bar for customer support. Naturally, our IBM Marketing Representatives are fully knowledgeable about the Personal System/2. But also, we're bringing even greater levels of support from our dealers to you.

IBM Authorized Advanced Products Dealers.

Announcing the new IBM Authorized Advanced Products Dealers.

Selected from our already outstanding dealers, they're being specially trained and qualified. They will have the IBM Personal System/2 computers, IBM network and connectivity products, peripherals, new IBM Operating System/2 when it's available, and all the support you should need.

Perhaps even more important, they'll have a new focus; on systems instead of single pieces of hardware, on solutions instead of circuitry.

They'll be thinking not only about the system you buy, but also about how you'll be using it.

They'll offer help with learning about systems and software, connectivity, and Operating System/2.

And they're committed to new standards of training for their sales, technical support, and service people.

No matter how big your business, whether you need one computer or a whole network's worth, the Advanced Products Dealer has what you need.

IBM Authorized Advanced Products Value Added Dealers.

If you're a specialist—a dentist, a librarian, a shipbuilder—you need help

The Advanced Products Dealer will provide new levels of training. It's all part of the IBM Personal System/2.

uy,

from a special kind of dealer.

Introducing the new IBM Authorized Advanced Products Value Added Dealers.

They're specialists, too. They build enhanced systems for specific industries and now, with the entire Personal System/2 family, their building blocks are better than ever. There's an Advanced Value Added Dealer who understands your business almost as well as you do.

IBM Authorized Dealers and Value Added Dealers.

Our IBM Authorized Dealers and Value Added Dealers will have the IBM Personal System/2 Model 30 and peripherals to go with it, plus special know-how for helping people get started in computing.

IBM Marketing Representatives.

These people have special skills for helping large companies and educational institutions make the most of their investment in the IBM Personal System/2.

And now, through the IBM Customer Fulfillment Option, our customers may also work with our dealers and value added dealers to get the best of both worlds; additional support for the Personal System/2 plus the benefits of dealing with IBM directly.

Congratulations are in order.

It's not easy to qualify (and stay qualified) as an Advanced Products Dealer. Our expectations are high, as high as yours are.

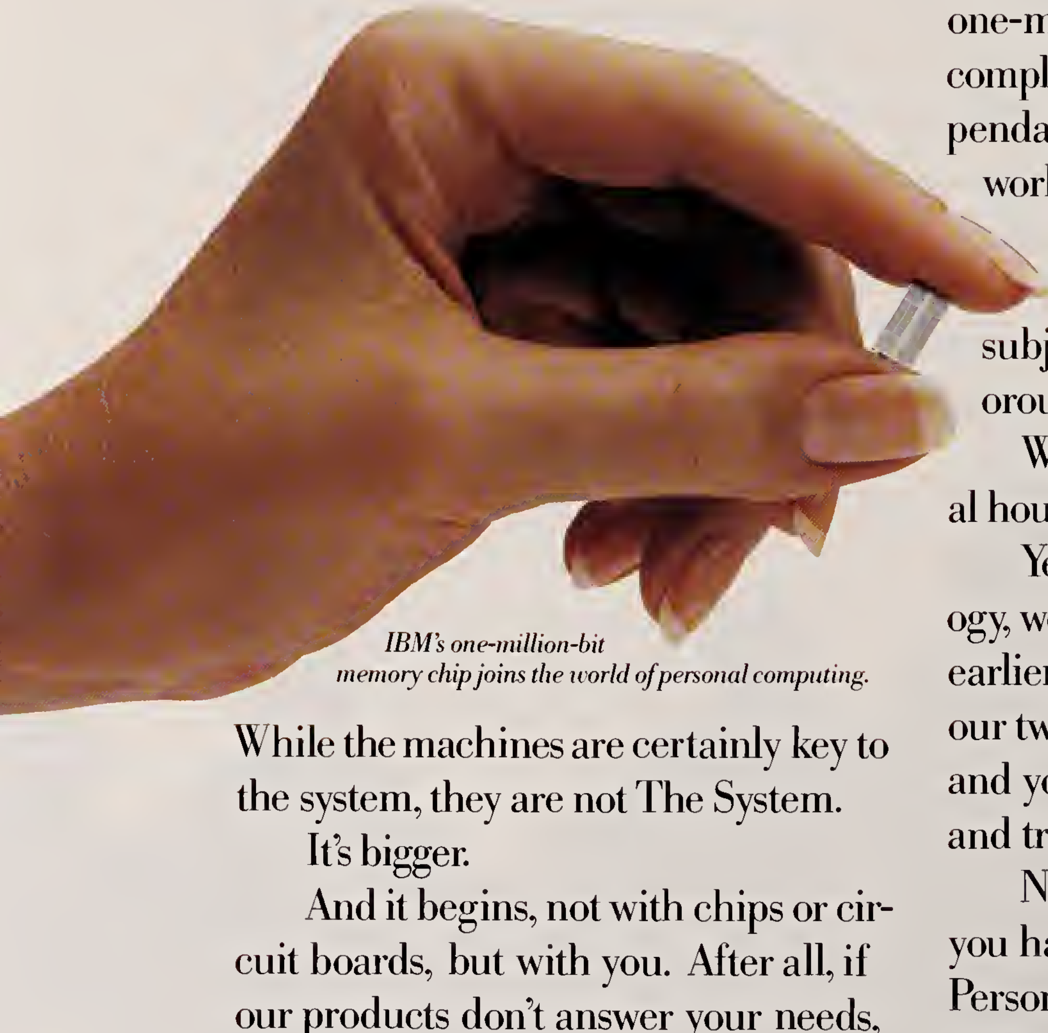
So when you visit one of our Advanced Products Dealers, give them a nice pat on the back. They've just signed up for a tough course.

A system that's bigger
sum of its parts.

A new direction.

The IBM Personal System/2 arrives in the wake of some fairly eager public speculation. So we expect there'll be a focus on "the new IBM PCs."

But our focus is different.



IBM's one-million-bit memory chip joins the world of personal computing.

While the machines are certainly key to the system, they are not The System.

It's bigger.

And it begins, not with chips or circuit boards, but with you. After all, if our products don't answer your needs, you don't need them.

So everything about the Personal System/2—how we build it, how you learn and use it, where you go to buy it, and how well it works with your other systems—is balanced to give you the highest overall performance.

A new quality.

We're making the Personal System/2 even more reliable than our earlier PCs.

With new Very Large Scale Integration technology, many pieces in a system are now replaced by one piece. Our one-million-bit memory chip reduces complexity, too. So costs go down, dependability goes up, and you get more work done in less time.

We're also using more IBM-made components, and we're subjecting our systems to more rigorous testing.

We even operate each one for several hours before it goes out the door.

Yet in creating all this new technology, we didn't forget that three million earlier IBM PCs are out in the world. So our two generations are close relatives, and your investment in equipment and training is protected.

Nor did we forget that many of you have larger IBM systems. The Personal System/2 will help you build better connections with IBM mid-range and mainframe computers.

New help.

We've also made the Personal System/2 easier to learn. New IBM manuals, tutorial

than the

diskettes, and start-up procedures will help you get your system going quickly.

So will the people you bought it from. Our new Advanced Products Dealers and IBM Marketing Representatives won't just sell you the right system, they'll be there to help you get the most out of it. And as your needs grow, they'll be able to help you expand your system to meet new challenges.

Earlier IBM PCs and the new IBM Personal System/2 work together so your investment is protected.

A continuing tradition.

It's said in the world of computing that the only constant is change, but that's not entirely true.

In IBM's world of computing one thing holds firm, and it's the notion of partnership between our people and our customers. The Personal System/2 is a product of that partnership.

IBM people are some of the best listeners in the business, and when they hear what you want, they do something about it.

We're very proud of them all, and the more you know about the IBM Personal System/2, the more you'll understand why.

And now for the fine print.

All models include integrated display support, 256-color graphics capability, clock/calendar, and ports for serial, parallel and pointing devices. All systems use a common IBM enhanced keyboard and accept any IBM Personal System/2 monochrome or color display. All models accept the 200MB IBM 3363 Optical Disk Drive option.

	Model 30	Model 50	Model 60	Model 80
Microprocessor	8086	80286	80286	80386
Potential system throughput[1]	Up to 2½ times PC XT	Up to 2 times Personal Computer AT	Up to 2 times Personal Computer AT	Up to 3½ times Personal Computer AT
Standard Memory	640KB	1MB	1MB	Up to 2MB
Expandable to		7MB	15MB	16MB
Diskette size and capacity	3.5 inch 720KB	3.5 inch 1.44MB	3.5 inch 1.44MB	3.5 inch 1.44MB
Fixed disk[2]	20MB	20MB	44, 70MB	44, 70, 115MB
Additional Options			44, 70, 115MB	44, 70, 115MB
Maximum configuration[3]	20MB	20MB	185MB	230MB
Expansion slots[4]	3	3	7	7
Operating system(s)	PC DOS 3.3	PC DOS 3.3 and Operating System/2	PC DOS 3.3 and Operating System/2	PC DOS 3.3 and Operating System/2

[1] Based on the testing described in the IBM Personal System/2 Performance Guide. Your results may vary [2] Model 30 also comes in a diskette-based configuration. [3] Models with 44MB fixed disk expandable to 88MB. [4] Model 30 accepts most IBM PC and IBM PC XT option cards. Models 50, 60 and 80 accept new IBM Micro Channel option cards.

Now that you've read all about the new IBM Personal System/2 and examined its specifications, what should you do?

Go to your telephone. Call 1-800-447-4700 (ext. 9) and you'll learn who's the IBM dealer nearest you. (In Alaska call 1-800-447-0890, in Canada 1-800-465-6600.)

And here are two things to ask when you finally get face to face.

Ask about an IBM Credit Card. It just makes buying that much easier for a person or a business.

Or, if you prefer leasing, ask an IBM authorized dealer or IBM Marketing Representative about the IBM leasing programs.

With those formalities out of the way, you'll want to join the next generation in personal computing. The IBM Personal System/2.

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G360-2757-00

Make these "people" laugh, and you could win $100 worth of software.

Announcing the 1987 Computerworld button contest!

Every year, as all you button freaks know, Computerworld distributes tens of thousands of buttons at trade shows around the country. For several years now, against our better judgment, we have been letting you, our readers, write these buttons. To our surprise, you have written some good ones (like those shown here). So, we're doing it again.

We're looking for a few good slogans — witty, relevant, SHORT (these are small buttons), and at least moderately clean. You may send in your entries on the form below or a copy.

But you may NOT send us everything that comes into your head. Our offices aren't big enough to handle all that paper! Please take the time to narrow your ideas down to the two best you can come up with (test them on your friends).

All entries will be shown to our panel of judges, who will be tied to their chairs until selections are complete. Six winning slogans will be picked, and everyone who sent in one of those slogans will be eligibile for a prize. If you are the only one to send in a winning slogan, you win the prize. If more than one person had the same intelligent idea, we'll pick the prize winner out of a hat. Prize winners will receive a $100 certificate good towards the purchase of software from a friendly neighborhood computer store.

All decisions of the judges will be final, and no representations as to their competence, skill, or sense of humor are being made. All entries will become the property of CW Communications/Inc. Deadline for entries is May 1, 1987 at our offices in Framingham, MA.

YES, I'd like to enter Computerworld's ridiculous button contest. My two slogans are written below. I understand the rules above, and realize that these entries will become the property of CW Communications/Inc. I hope your judges can read!

____

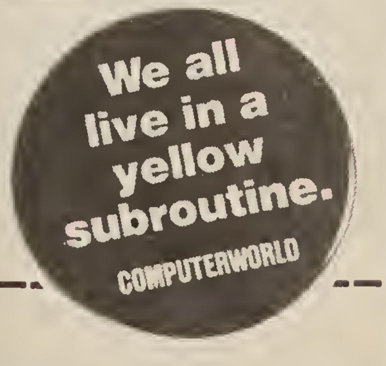
____

____

____

Name: ____________________
Company: ____________________
Address: ____________________
City: __________ State: ____ Zip: ______
Phone (in case I win): ____________________

SEND TO: Mary Doyle, Computerworld, Box 9171,
Framingham, MA 01701-9171.



NEW PRODUCTS

Processors

Unbound, Inc. has introduced the **QV series** of its Qube desktop computer system.

The QV series is said to support the Digital Equipment Corp. Microvax II processor and large capacity Winchester disk drives using the enhanced small device interface standard.

A typical entry-level configuration includes a Microvax II CPU, 5M bytes of main memory, RX-50 dual floppy disks or an RX-33 single floppy drive and an 85M-byte half-height Winchester disk drive. It can support nine users. Main memory can be expanded up to 16M bytes and disk storage capacity can be expanded up to 760M bytes.

Prices for the QV series start at $19,830.

Unbound, 15239 Springdale St., Huntington Beach, Calif. 92649.

Graphics systems

Template Graphics Software, a division of Megatek Corp., and **Tech-Source, Inc.** in Minneapolis have announced support of Megatek's **Figaro** software with the Tech-Source **GDS-3800** VME bus graphics controller.

Figaro is said to be a conformant implementation of the Programmer's Hierarchical Interactive Graphics Standard. It operates in Digital Equipment Corp. VAX/VMS, IBM CMS and MVS and Unix-like environments.

The GDS-3800 graphics controller generates a 1,280- by 1,024-pixel display, the vendor said.

The combination utilizes the Motorola, Inc. VME Delta series supermicro computer as a workstation.

The Motorola VME Delta series is priced from $20,000. The Tech-Source GDS-3800 costs $4,995. The single license fee for Figaro is $5,000.

Template Graphics Software, 9645 Scranton Road, San Diego, Calif. 92121.

Megatek Corp. has announced the **9100** three-dimensional graphics display system and the **9300** advanced surface rendering graphics display system.

Both systems are said to offer Tektronix, Inc. 4000 and 41000 and VT 100 emulation as well as compatibility with peripherals such as joysticks, valuators, tablets, printers and large screen projectors. They work with host processors via direct memory addressing, Ethernet or RS-232 interfaces.

The 9100 offers 256 colors from a palette of 16.7 million. Features include polygon fill, depth cueing and X, Y and Z axis clipping. The 9300 offers 4,096 colors from a palette of 16.7 million. Features include dual buffering of graphics and overlay planes and true hidden surface removal.

The 9100 costs from $24,500 and the 9300 from $35,000.

Megatek, 9645 Scranton Road, San Diego, Calif. 92121.

Logic Sciences, Inc. has introduced the **Turbograph 300 Series III**, a stand-alone vector-to-raster processor.

The processor was designed to convert data supplied by host IBM 3274 cluster computer environments into a format that can be printed on various ink jet, thermal, laser or electrostatic printers and plotters. Features include IBM 3287 emulation in Systems Network Architecture Control String and 3270 Data Stream Characters modes. Support is provided for the Computer Graphics Metafile standard.

Features include extended 8-bit ASCII character sets, hex transparent transmission mode and the ability to establish a unique translation from IBM code to ASCII for up to 32 char.

The Turbograph 300 Series III costs $3,995.

Logic Sciences, 108808 Fallstone Road, Houston, Texas. 77099.

Chromatics, Inc. has unveiled the **CX-II** color graphics system in both two-dimensional and three-dimensional configurations.

Both models offer 1,536- by 1,152-pixel display resolution on a 60 Hz noninterlaced monitor, driven by a 13-board graphics engine. The 2-D configuration includes 4M bytes of display-list memory, eight planes of double-buffered memory and text overlay and a Sun Microsystems, Inc. and Unix-based Graphics Kernal System software library.

The 3-D configuration provides a shading processor and CX3D microcode as well as the same firmware with a 2M-byte display-list memory. It runs Digital Equipment Corp. VAX/VMS-based CX3D, C and Fortran.

Both configurations cost $39,995.

Chromatics, 2558 Mountain Industrial Blvd., Tucker, Ga. 30084.

Data storage

National Memory Systems Corp. has announced the **8301**, an enhanced small-device interface (ESDI) disk controller for IBM's RT Personal Computer.

The disk controller is said to provide support for up to four ESDI disk drives with disk data transfer rates to 1.85M bit/sec. It features a direct-memory addressing state machine on-board, said to allow for maximum data transfer, and interfaces to IBM's AIX operating system.

Continued on page 71

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PC
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Lotus 1-2-3
dBase III
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System/38
Introduction to S/38
Workstation Operator Training
Application Development Fundamentals
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®UNIX is a registered trademark of AT&T
™XENIX is a trademark of Microsoft.

What can you expect from the new LaserJet Series II Printer?

Everything.

Because the LaserJet Series II Printer from Hewlett-Packard is the product of experience. It's a second generation printer from the company with the world's largest installed base of laser printers.

Whatever your company's needs, the LaserJet Series II will deliver the performance you expect, at up to 8 pages/minute.

Take a simple memo like the Soup letter we created with Microsoft Word. As you can see, you can print in a variety of formats and type styles with our wide selection of LaserJet fonts.

Or you can create a sophisticated combination of text and graphics. With additional plug-in memory, you can also produce full-page 300 dpi graphics, like our Nuts form shown below. To do this, we used HP's new ScanJet desktop scanner, Microsoft Windows and Pagemaker® from Aldus.

With support by more than 500 of the most popular software packages, the LaserJet Series II Printer can produce whatever type of business document you need. And LaserJet Series II works with all popular PCs so it can easily be integrated into your existing system.

In fact, only the price is unexpected —starting as low as $2495.*

For the authorized dealer nearest you, call us at 1 800 367-4772, Ext. 282T.

HEWLETT PACKARD

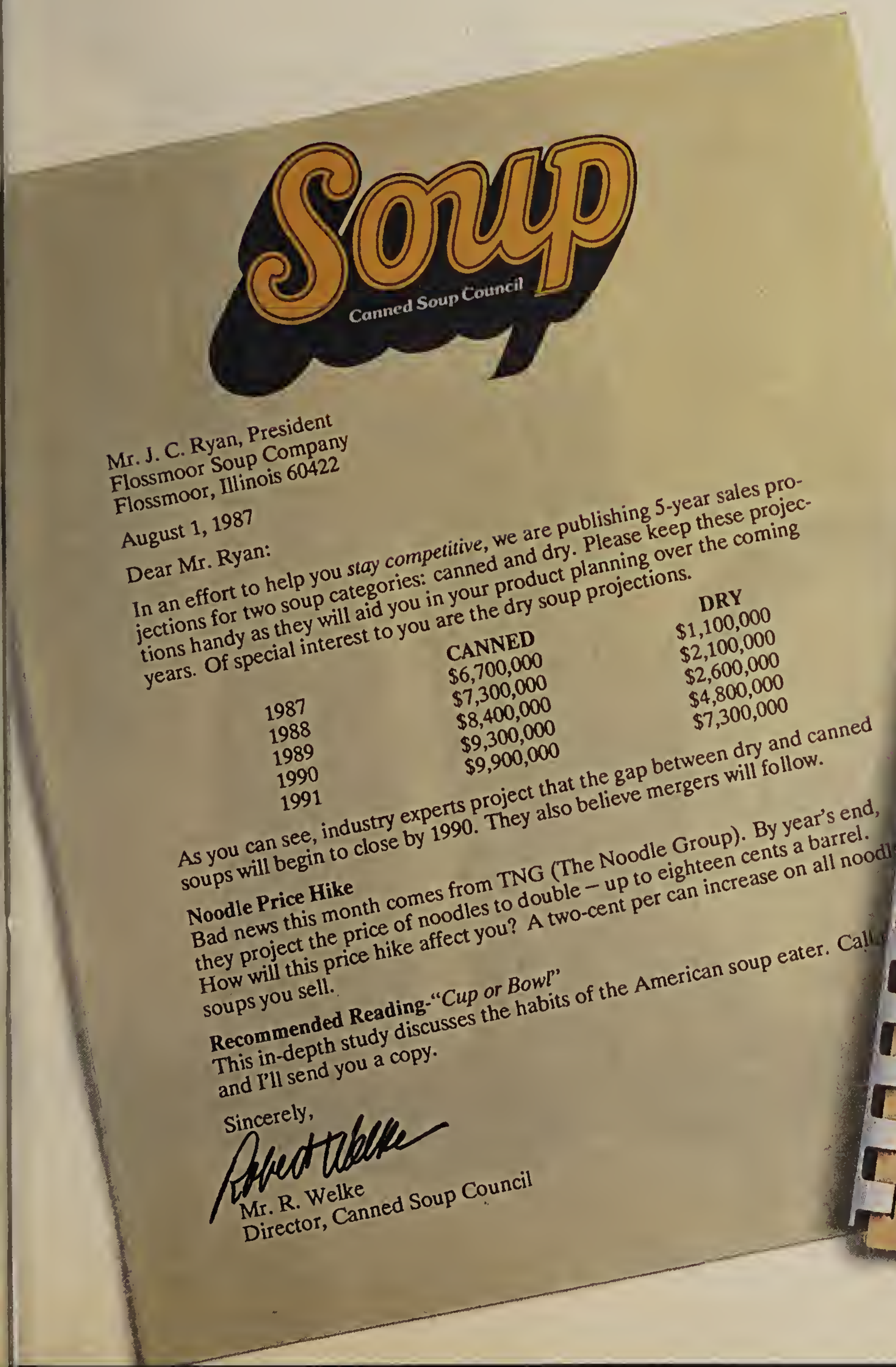
Business Computing Systems

Microsoft is a registered trademark of Microsoft Corp. Pagemaker is a U.S. registered trademark of Aldus Corporation

*Suggested U.S. list price. © 1987 Hewlett-Packard Co. PE12702CW4

we never stop asking

"What if..."



Soup

Canned Soup Council

Mr. J. C. Ryan, President
Flossmoor Soup Company
Flossmoor, Illinois 60422

August 1, 1987

Dear Mr. Ryan:

In an effort to help you *stay competitive*, we are publishing 5-year sales projections for two soup categories: canned and dry. Please keep these projections handy as they will aid you in your product planning over the coming years. Of special interest to you are the dry soup projections.

	CANNED	DRY
1987	$6,700,000	$1,100,000
1988	$7,300,000	$2,100,000
1989	$8,400,000	$2,600,000
1990	$9,300,000	$4,800,000
1991	$9,900,000	$7,300,000

As you can see, industry experts project that the gap between dry and canned soups will begin to close by 1990. They also believe mergers will follow.

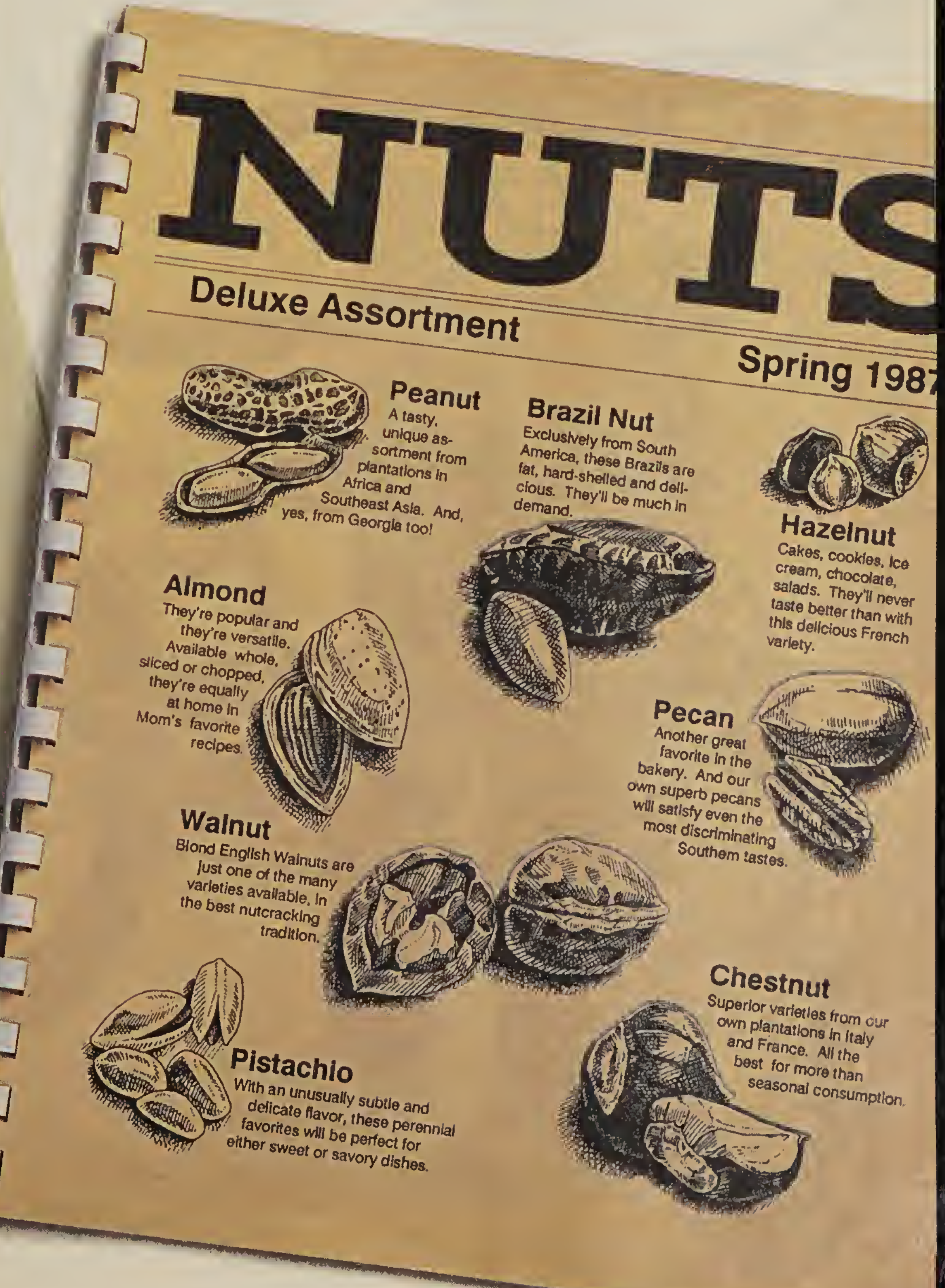
Noodle Price Hike
Bad news this month comes from TNG (The Noodle Group). By year's end, they project the price of noodles to double – up to eighteen cents a barrel. How will this price hike affect you? A two-cent per can increase on all noodl
soups you sell.

Recommended Reading-*"Cup or Bowl"*
This in-depth study discusses the habits of the American soup eater. Cal
and I'll send you a copy.

Sincerely,

Robert Welke

Mr. R. Welke
Director, Canned Soup Council



NUTS

Deluxe Assortment

Spring 198

Peanut
A tasty, unique assortment from plantations in Africa and Southeast Asia. And, yes, from Georgia too!

Brazil Nut
Exclusively from South America, these Brazils are fat, hard-shelled and delicious. They'll be much in demand.

Hazelnut
Cakes, cookies, ice cream, chocolate, salads. They'll never taste better than with this delicious French variety.

Almond
They're popular and they're versatile. Available whole, sliced or chopped, they're equally at home in Mom's favorite recipes.

Pecan
Another great favorite in the bakery. And our own superb pecans will satisfy even the most discriminating Southern tastes.

Walnut
Blond English Walnuts are just one of the many varieties available, in the best nutcracking tradition.

Chestnut
Superior varieties from our own plantations in Italy and France. All the best for more than seasonal consumption.

Pistachio
With an unusually subtle and delicate flavor, these perennial favorites will be perfect for either sweet or savory dishes.

A boy and his bike should never be apart for long. And in Fort Collins, Colorado, they seldom are, because the city's Meridian SL-1* Integrated Services Network is more than a PBX. It's a way to know which boy belongs to which bike. And more.

It networks 200 workstations, two DEC and two Hewlett-Packard minicomputers, a Sperry mainframe and, of course, their entire phone system. And it prepares them for a future where sharing voice, data, text and image will be as easy as using a phone. Call (800) 328-8800.

nt northern telecom

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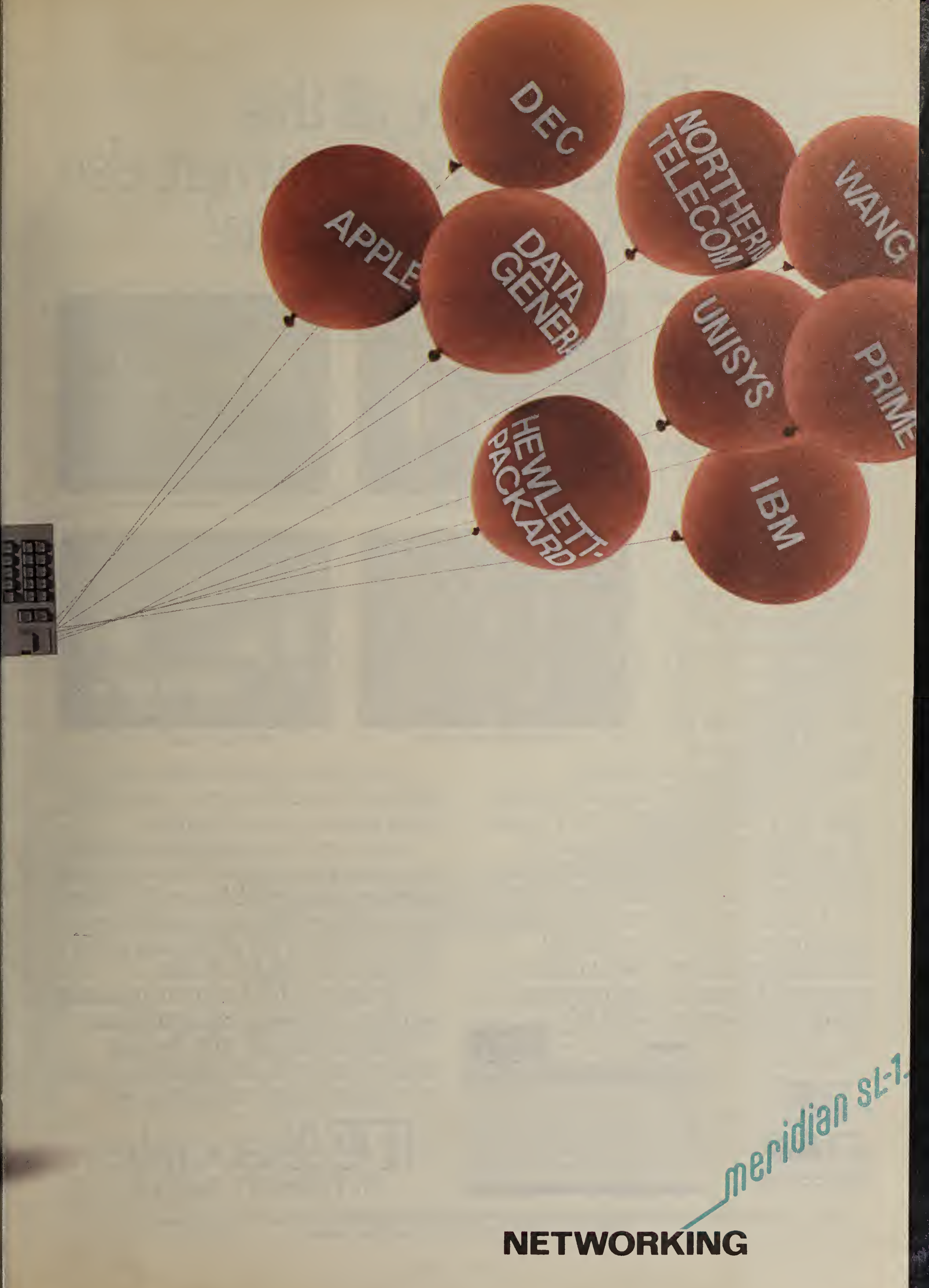
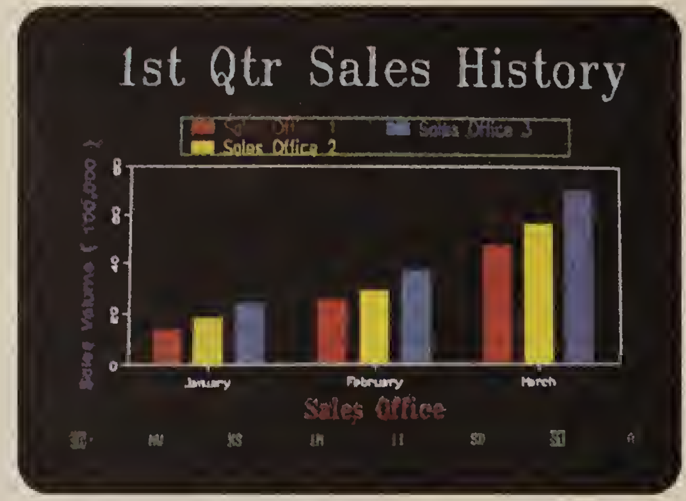

DEC
NORTHER
TELECOM
WANG
APPLE
DATA
GENER
UNISYS
PRIME
HEWLETT-
PACKARD
IBM
meridian SL-1
NETWORKING

If you can see all this with your PC, why look anywhere else for 3X communications?

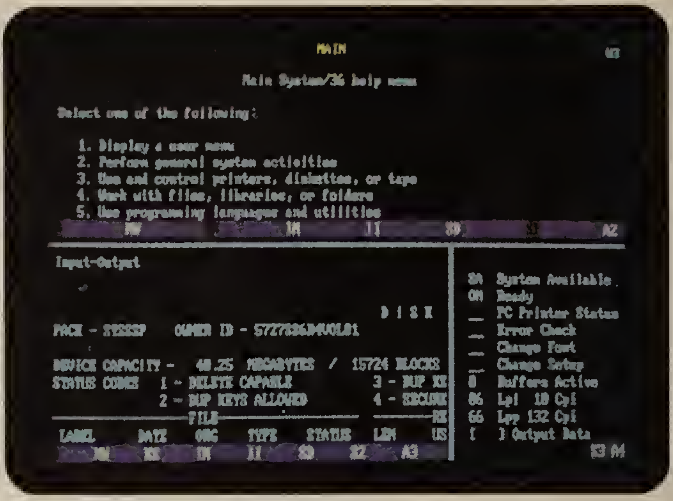
Here on this page we offer you a graphic display of the latest developments in PC to IBM System 3X connectivity.

Each advancement is a direct result of a simple yet definitive belief. A belief that proposes if you listen to what people want, then you have a better chance of giving people what they need.

This is precisely the spirit that has made us the leader in PC to 3X communications. A position earned through progressive thinking and supported by progressive products.



IBM 5292 Model 2 graphics



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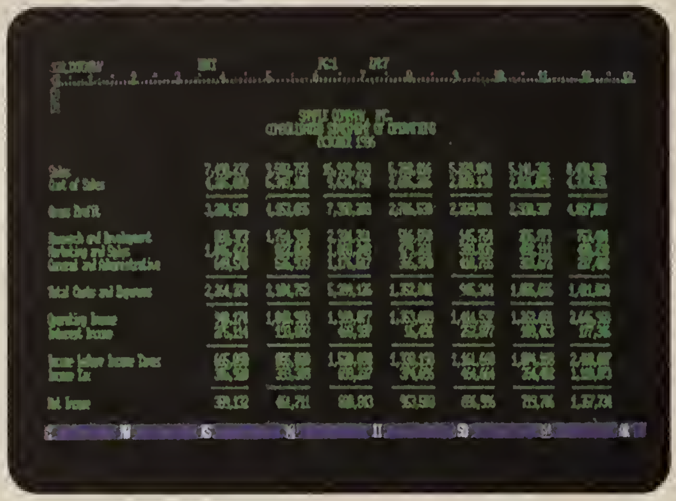
MAIN
Main System/36 help menu

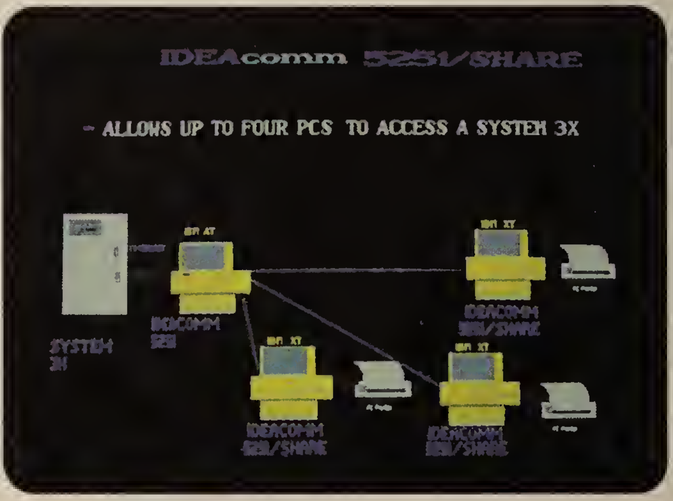
Select one of the following:

  1. Display a user menu
  2. Perform general system activities
  3. Use and control printers, diskettes, or tape
  4. Work with files, libraries, or folders
  5. Use programming languages and utilities
```

Windows with multiple host sessions



IBM 3180 terminal emulation



5251/Share for additional users

With 5292 Model 2 emulation you can create and print graphs right on the PC using 3X applications such as IBM's Business Graphics Utility. This eliminates the purchase of a $7,000 graphics terminal.

You can revel in 3180 terminal emulation that transforms your PC into a full 132-column display terminal. Use it to view expansive 3X financial or data processing reports in their entirety on the PC.

Our windows feature multiple host sessions. You see the real time status of up to four sessions on one PC screen.

If you need to connect additional users, but communications ports or station addresses are limited, consider IDEAcomm 5251/Share. Up to three user PCs, each emulating two sessions (terminal and printer), can access the System 3X through software.

We also have IDEAcomm 5250 products for remote synchronous communications.

Call us at 800-257-5027. Because when it comes to 3X communications, only one company displays this much power.

IDEAssociates™
The Leader in PC Technology.

IDEAssociates, Inc., 29 Dunham Road, Billerica, MA 01821, (617) 663-6878, Telex 4979780; France, Switzerland, Germany, United Kingdom, Hong Kong.
IBM is a registered trademark of International Business Machines Corporation.

Continued from page 66

The 8301 is priced from $695 in quantities.

National Memory Systems, 355 Earhart Way, Livermore, Calif. 94550.

Tolerant Systems, Inc. has announced the **Model D510** 516M-byte Winchester drive and the **Model T310** and **T320** nine-track magnetic tape drives.

According to the vendor, two Model D510 drives can be mounted side by side in the standard 19-in. racks of the vendor's Eternity series system cabinet. The D510 is compatible with the Storage Module Drive electrical interface.

The T310 and T320 drives operate at 50 in./sec. in start/stop mode. The T310 supports dual-data recording densities of 6,250 and 1,600 bit/in. The T320 also supports 800 bit/in. densities.

The D510 costs $17,500. The T310 and the T320 cost $16,500 and $17,300, respectively.

Tolerant Systems, 81 E. Daggett Drive, San Jose, Calif. 95134.

Terminals

NCR Corp. has announced the **Quick Service**, **Bar Restaurant** and **Food Service** point-of-sale systems.

The Quick Service System for multiunit customers features stand-alone intelligent terminals, sales activity tracking, cashier accountability and an integrated manager's workstation.

The Bar Restaurant System offers more than 800 menu items, up to five menus, more than six servers and tracking of more than 400 guest checks. The system can be linked to up to six terminals and four multiple remote-preparation printers or CRTs.

The Food Service System can track more than 400 guest checks as well as three menu levels with more than 300 items.

Prices for typical configurations range from $2,500 to $4,500.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479.

Tektronix, Inc. has announced a keyboard and firmware said to give its **4200 Series Color Graphics Terminals** both Digital Equipment Corp. VT200 and IBM Graphical Data Display Manager (GDDM) compatibility.

The compatibilities allow users to run VT200 alphanumeric applications in addition to all existing 4100 and 4200 graphics applications. GDDM compatibility supports the graphics functionality of IBM 3179G terminals as well as IBM 3179 alphanumerics. Also, the 4200 terminals support segments and provide local display-list memory.

The 4200 series will provide VT200 compatibility at no extra charge beginning in May, the vendor said. GDDM compatibility is included with the optimal coaxial interface price of $750. Prices for the 4200 series range from $2,495 to $6,996.

Tektronix, P.O. Box 15273, Portland, Ore. 97215.

General Business Technology, Inc. has introduced the **GBT Laserstation** for the IBM Systems/34, 36 and 38.

The Laserstation is said to be compatible with Displaywriter/36 software. It includes the 6636PM, an 8 page/min. desktop laser printer, and the 7710DS, a full-feature display with a 3180-style keyboard, the vendor said.

User program access provides zoom control, alternate character sets, keyboard buffer and cursor location. The user can store up to 3,947 characters in any of 24 memory locations and play them back on demand.

The Laserstation is priced at $4,495. Optional font cartridges for the 6636PM cost from $150 to $330. An optional programmable mouse costs $100.

General Business Technology, 1891 McGraw Ave., Irvine, Calif. 92714.

Lexi Computer Systems Corp. has announced the **Lexi 1019** compact laser printer.

The 1019 is said to offer 10 page/min. print speed and extensive bar-code capabilities. It provides 39 bar-code types, including EAN-8, MSI, UPS A and Code 39. It emulates the IBM 5219 and features a switchable RS-232 interface, 36 resident fonts, customized fonts and 300 dot/in. print resolution.

Vector graphics capabilities include line, box, circle, pie, arc and fill patterns. The Lexi 1019 is priced at $5,690.

Lexi Computer Systems, Suite 1D, 231 Sutton St., North Andover, Mass. 01845.

Input devices

NBI, Inc. has introduced the **Pro-Scan** image scanner.

The Pro-Scan is a flatbed scanner said to allow users to scan line art, schematics, computer-aided design drawings, forms, paper stocks, books and other formats up to 8½ by 11 in. It can also be used to obtain halftone renderings of original art.

Pro-Scan is priced at $9,995.

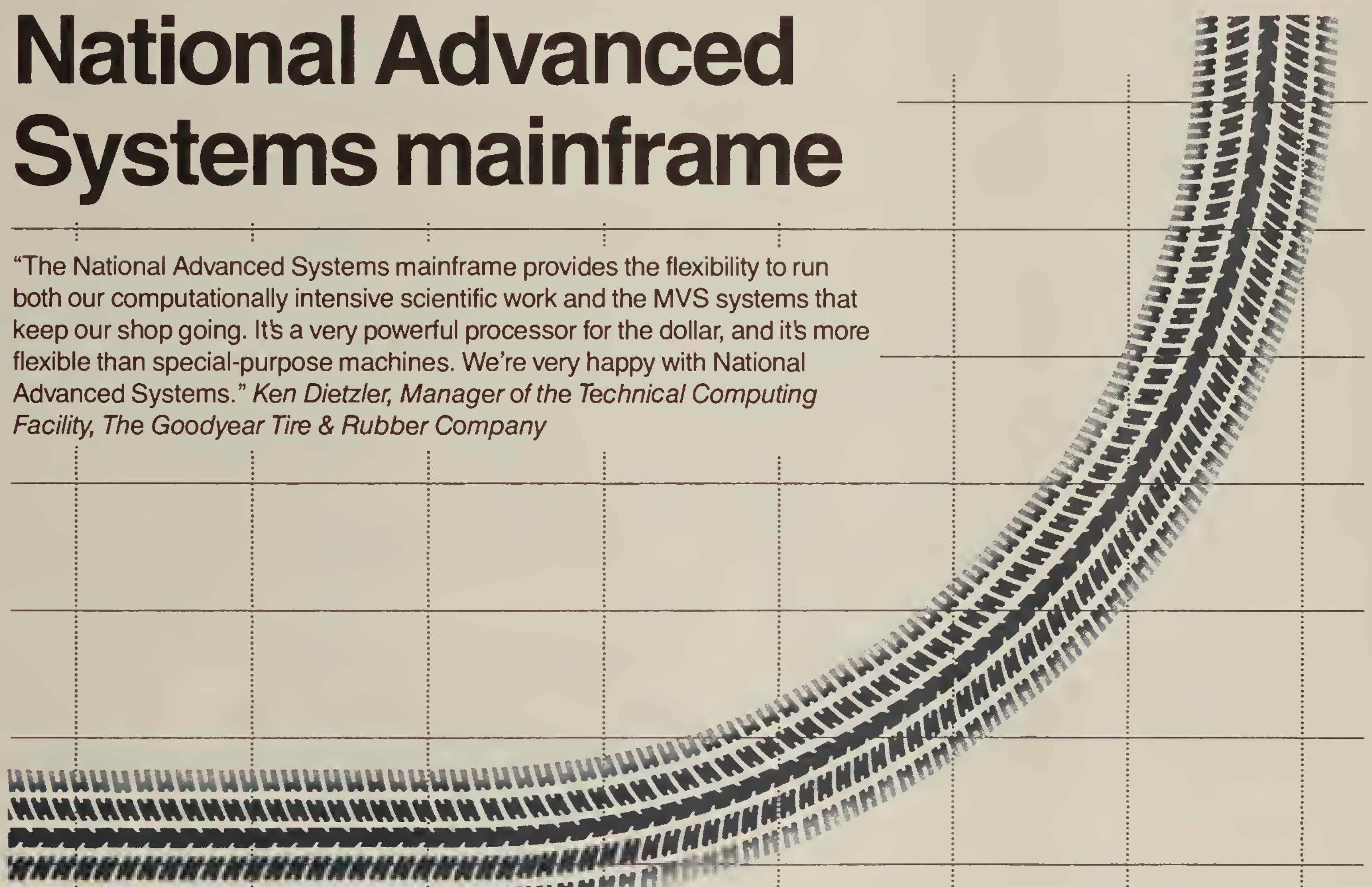
NBI, P.O. Box 9001, 3450 Mitchell Lane, Boulder, Colo. 80301.

Aedex Corp. has announced the **Aedex MBL-300** moving-beam laser scanner.

The scanner is said to attach to a high-speed decoder such as the Aedex BCD-200. It was designed to operate in applications where noncontact scanning or no hand movement is desirable.

The MBL-300 scanner with heavy-duty cord is priced at $795.

Aedex, 1070 Ortega Way, Placentia, Calif. 92670.



National
Advanced
Systems

Goodyear makes tracks with its National Advanced Systems mainframe

"The National Advanced Systems mainframe provides the flexibility to run both our computationally intensive scientific work and the MVS systems that keep our shop going. It's a very powerful processor for the dollar, and it's more flexible than special-purpose machines. We're very happy with National Advanced Systems." *Ken Dietzler, Manager of the Technical Computing Facility, The Goodyear Tire & Rubber Company*

When The Goodyear Tire & Rubber Company puts a new tire on the road, the reputation of the world's largest tire producer rides with it. And rides. And rides. And rides. Goodyear's tires are famous for peak road performance that sets the world's largest tire producer apart from the competition.

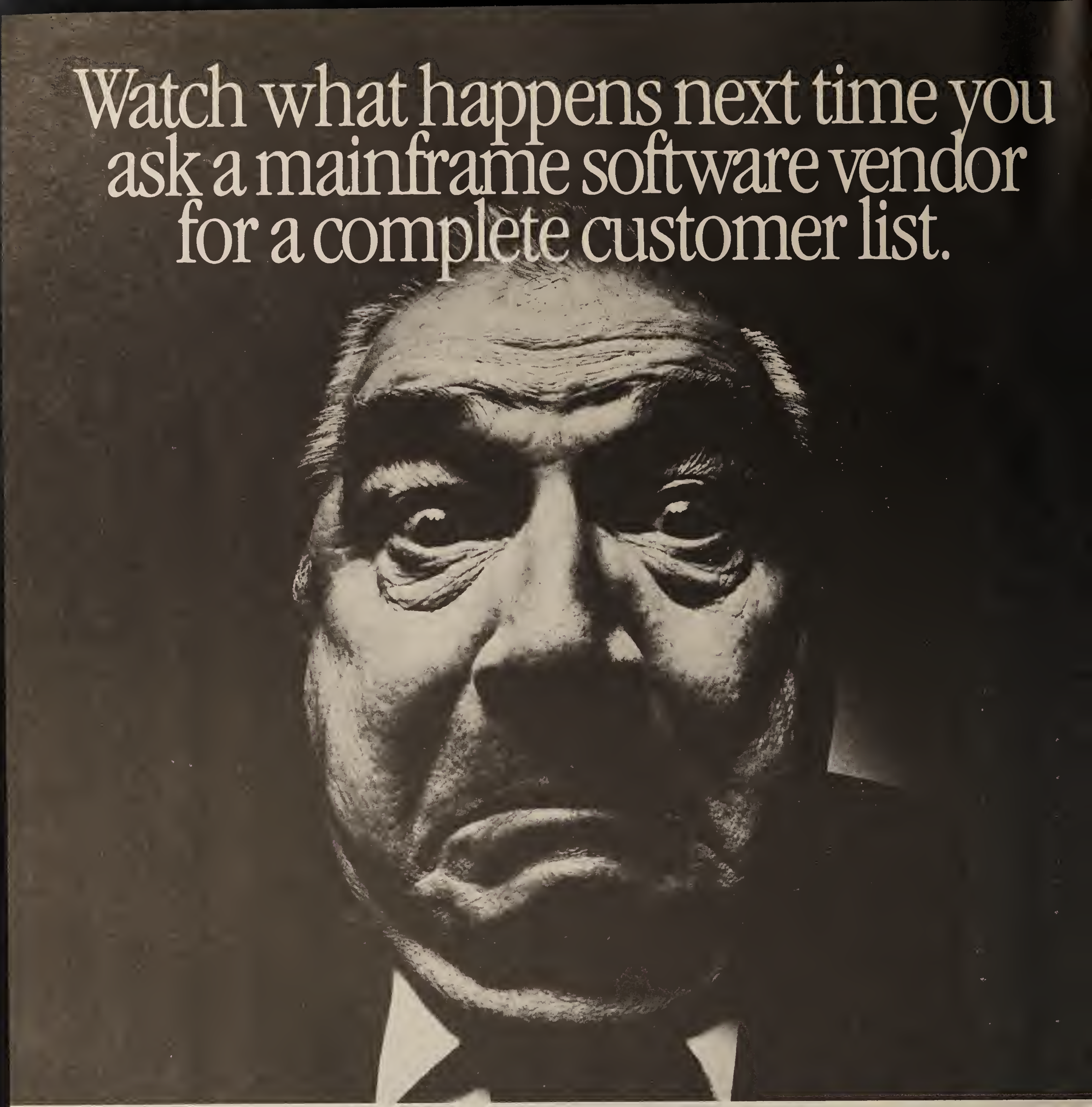
To help design "state-of-the-science" tires, such as the Eagle VR 'Gatorback' High Performance Radial, Goodyear relies on peak computing performance from National Advanced Systems.

A National Advanced Systems vector mainframe powers the finite element structural analyses that enable Goodyear's engineers to quickly and effectively model the actual road characteristics of new tire designs. Plus the National Advanced Systems mainframe is fully compatible with Goodyear's IBM environment.

National Advanced Systems' customers, such as Goodyear, buy our products because they perform. They keep them because we perform. Our mainframes and storage systems are renowned for quality and reliability unsurpassed in the IBM-compatible environment. We add to this exceptional value with a very simple feature. We listen. We work closely with you to provide innovative solutions that meet your unique requirements. We back up these solutions with the top-ranked service and support in the industry.

To get peak performance from your data center, write John Diedenhofen, Vice President of Marketing, MS 52, P.O. Box 7300, Mountain View, CA 94039. Or, call 415-962-6100.

The preferred choice of informed mainframe and storage systems users around the world



Watch what happens next time you ask a mainframe software vendor for a complete customer list.

You may get a convincing song and dance, but underneath it's a different story. Behind those pat answers that software vendor is actually sweating and squirming.

Why don't they want you to see a complete list? Simple. They know that their size and name familiarity do not guarantee happiness. Many "single source" or "all-things-to-all-people" vendors have, at best, uneven quality across a multi-application product line. They know that their customer list may contain a good number of less-than-happy clients. It's difficult for these vendors to commit the human and monetary resources necessary to produce the type of superior product available from a firm that specializes in a single application area. A firm like Data Design.

Data Design develops mainframe financial applications software. Period. We understand all our users' requirements and are therefore able to provide the necessary support: over 40 percent of our support and installation staff are CPA's or have MBA's.

Data Design doesn't balk at giving prospective customers a *complete* customer list. That's because hundreds of FORTUNE 1000 companies have reaped exceptional results from our financial software systems. Alcoa, Gerber, Pillsbury, Sherwin-Williams, Merrill Lynch, Bankers' Trust, Bristol-Myers, Federal Express, Litton, Lloyd's Bank, The New York Times Company, Owens-Corning, Royal Business Machines, Warner-Lambert and hundreds more have opted for Data Design over other major vendors. Write for our complete customer list and ask *anyone* on it about our fast, trouble-free implementation; system flexibility and ease of use; in-depth training and responsive, knowledgeable support; *management level* people in customer service positions, and more.

You'll find that people who want financial software relief choose Data Design. Since 1973, nationally recognized independent software surveys have confirmed Data Design's unsurpassed record of user satisfaction—year after year. That's why we'll give you a complete customer list—and *they* won't.

So, if you're in the process of looking at mainframe financial software for your company, put Data Design on your list. Then tell the other vendors on it you're also looking at Data Design. And watch what happens.

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PROJECT ACCOUNTING SYSTEM

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Computer-Aided Software Engineering Symposium

Washington, D.C.
June 22-24, 1987

Guest Speakers:
Al Case
Dr. Peter Chen
Ken Orr
Ed Yourdon

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AMERICAN MANAGEMENT SYSTEMS
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The First Conference on Computer-Assisted Application Development

If you are responsible for developing application software, we want to alert you to revolutionary new technology called Computer-Aided Software Engineering (CASE). CASE extends both 3rd and 4th generation languages by providing automated support to all phases of the development life cycle process.

A key problem with current development tools is the lack of front-end facilities that support the design and specification phases of the life cycle. This lack often results in the introduction of errors in specification and design.

Manual structured specification techniques are often used as an aid in the application design process. However, manually created structured diagrams cannot be converted automatically into code. CASE, on the other hand, provides a technique to **automatically** convert design specifications into code.

No standards have yet emerged for CASE technology. Different software vendors are offering many approaches. The CASE Symposium (CASES) will present the different approaches being used for design automation. In three intensive days, you will be able to evaluate, compare and contrast these approaches and to incorporate this new technology effectively within your development methodology.

Please read this brochure for a more complete description of this major new conference. If you're involved in programming, you need to be aware of this important field and how it can improve the quality and reliability of your organization's programs.

Geo Schussel
Dr. George Schussel
President
Digital Consulting, Inc.

Carma McClure
Dr. Carma McClure
Author and Lecturer
Software Maintenance:
The Problem and Its Solution

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Computer-Aided Software Engineering Symposium

Washington, D.C., June 22-24, 1987

WHAT YOU SHOULD KNOW ABOUT CASE TECHNOLOGY

CASE Technology brings the same benefits to software development as CAD/CAM has brought to manufacturing. Both CAD/CAM and CASE enforce a disciplined, engineering approach to the development of systems. Both use interactive graphical design techniques, design checking rules, encyclopedias of design elements, and simulation. These techniques are applied and enforced throughout all phases of the design, development, manufacturing, testing, deployment, and maintenance process.

CASE provides process and tools for every part of the software lifecycle and for every type of software system. Large and small, commercial and scientific, online and real time system development can all be improved with the use of CASE technology. Different CASE tools have been created to focus on particular aspects of systems development and project management and different types of software systems including COBOL, PL1, C, Ada, and embedded applications. Figure 1 shows some key functions provided by CASE products. Products which implement all of these functions for the development of all types of systems and standards (eg. D.O.D. 2167) will be discussed and analyzed at CASES.

Front-end CAD/CAP diagramming techniques: Most CASE tools utilize computer-aided design and programming techniques to create diagrams of the system design. Analysts are able to create, verify, and revise drawings on an interactive screen. Specifications for the system are stored in graphical form in a central dictionary or encyclopedia.

Design analyzers: The function of the design analyzer is to detect internal inconsistencies, ambiguities, and omissions in the design specifications. Design analyzers in current CASE tools are being improved rapidly to incorporate smart editors, intelligent assistants, and expert systems.

Code generators: Many CASE tools are moving toward the incorporation of a code generation module which generates application code automatically from consistent design specifications.

SPECIFICATIONS

Encyclopedia or repository: A number of CASE tools incorporate an automated encyclopedia which is used as a central repository of knowledge about the enterprise and its structure, functions, procedures, data models, data entities, entity relationships, process models, etc. Sufficient detail is maintained about the design of a procedure so that program code for that procedure can be generated automatically.

Expert Systems: A few CASE tools are beginning to incorporate expert systems that apply inference processing to a knowledge base which contains data and rules. Initially, expert systems are being used to detect inconsistent or incorrect data base actions. However, they are likely to be extended to support the front-end graphical design process, and to generate efficient code.

Methodologies: CASE tools are moving toward the incorporation of a disciplined methodology that guides the analyst step-by-step in the application of the tool. The application of a comprehensive methodology brings a more standardized approach to systems development, and enables management to gain better control over the development process.

The functions of CASE tools are described in Figure 1 below. All of these concepts and the tools which implement them will be discussed and analyzed in CASES.

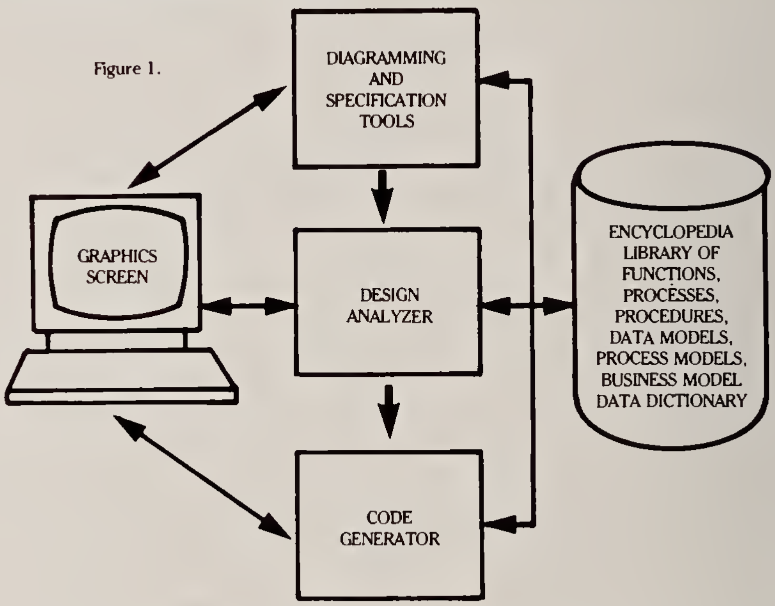
Figure 1.
DIAGRAMMING AND SPECIFICATION TOOLS
GRAPHICS SCREEN
DESIGN ANALYZER
ENCYCLOPEDIA LIBRARY OF FUNCTIONS, PROCESSES, PROCEDURES, DATA MODELS, PROCESS MODELS, BUSINESS MODEL DATA DICTIONARY
CODE GENERATOR

Figure 1

Day One of the CASE Symposium provides a comprehensive review of the CASE technology, the characteristics of CASE systems, and the CASE development environment. The presentation will show you how these major components are integrated in specific products.

MAJOR TRENDS IN CASE TECHNOLOGY

The design of CASE products is being driven by important technology trends in the following areas:

Human factoring: Major improvements have been made in human interfaces, including simplified, intuitive command interfaces, elimination of alien syntax, use of graphics, etc.

PC orientation: Many CASE products are available as intelligent workstations within the PC environment. The PC environment provides dedicated processing capability, decisecond response time, superior graphics, and access to thousands of PC software support packages.

Design automation: Front-end graphical design techniques are being improved rapidly. These support the specification of systems in graphical form using consistent diagrams that are sufficiently complete to be converted automatically into code.

Artificial intelligence: CASE tools are making increasing use of AI techniques, including the incorporation of expert system shells and a knowledge base of rules of interface.

These technology trends are converging to produce a new generation of tools that are fundamentally different from previous technology. Digital Consulting's lecturers and consultants will alert you to the significance of these new trends in technology, and will show how individual CASE products incorporate these new ideas.

DAY ONE

Day One

The first day of CASE Symposium provides a complete review of the technology; the major trends, characteristics, components, environment, changes to the software life cycle, productivity benefits, and future issues.

Days Two and Three

Days two and three of CASES consist of one-hour technical product presentations from all of the leading developers of CASE products. Consultants from DCI will be available to direct you to the right presentations and answer your questions on CASE technology. Distinguished guest speakers, including Dr. Peter Chen, Albert Case, Ken Orr, and Edward Yourdon, will appear during the luncheon and afternoon to share their insights into where this technology is heading. Evening hospitalities will allow you to actually see and test the leading CASE products hands-on.

DAY ONE-SEMINAR

Dr. Carma McClure
Guest Speaker
Dr. Carma McClure, internationally known author and lecturer will lead the CASE Symposium overview. Dr. McClure specializes in software methodologies, software law and project management. Since 1974, she has served as a software consultant to the industry, and has worked with major corporations including Time, Inc., Blue Cross/Blue Shield, Western Electric, GTE, Bell Labs, Bellcore, Diebold, Nixdorf, Texas Instruments, Digital Equipment Corp., and Dupont.

Dr. McClure is a software engineer and has taught software engineering courses at Illinois Institute of Technology (IIT) and Northwestern University. She has co-developed several video-based training courses on structured techniques, structured design methodologies, and software maintenance. She has also served as a National ACM Lecturer and has conducted numerous professional seminars on software maintenance. Her publishing credits include numerous articles on software and six books, including four co-authored with James Martin.

CASE SEMINAR OUTLINE

1. **Overview of Computer-Aided Software Engineering (CASE)**
2. **CASE Technology**
   - a. What is CASE Technology
   - b. Automation of Automation
   - c. Automation of Software Life Cycle
   - d. Linking Design Automation and Program Automation
   - e. Total Solution to Software Crisis
   - f. Evolution of CASE Technology
   - g. Current CASE Issues
3. **Characteristics of CASE Systems**
   - a. New Software Development Environment
   - b. Graphic Design Capabilities
   - c. Central Information Repository
   - d. Tightly Integrated Tool Sets
   - e. Full Life Cycle Coverage
   - f. Prototyping Support
   - g. Automatic Code Generation
   - h. Automatic Correctness and Consistency Checking
   - i. Key CASE System Concepts
   - j. CASE System Comparison Criteria
4. **Review of Vendor Products**
   A discussion of how to categorize CASE products:
   - a. CASE Toolkits
     - – Analyst Toolkits
     - – Programmer Toolkits
   - b. CASE Workbenches
     - – Software Engineering Workbenches
     - – Information Engineering Workbenches
   - c. CASE Methodology Companions
     - – Documentation Systems
     - – Guidance Systems
5. **CASE Environment**
   - a. PC Workstations
   - b. PC Tool Sets
   - c. Mainframe Tool Sets
   - d. PC-Mainframe Link
   - e. One, Two, and Three Tiered Architectures
6. **Changes to the Software Life Cycle**
   - a. Front End Loading – Increased Emphasis on Analysis Phase
   - b. Object-Oriented Program Design
   - c. Minimizing Manual Implementation Tasks
   - d. Rapid Iterative Prototyping
   - e. Minimizing the Need for Testing
   - f. Merging Development and Maintenance Strategies
7. **CASE Productivity Benefits**
   - a. Increasing Productivity by a factor of 20
   - b. Getting More from Each Developer
   - c. Reducing the Change and Maintenance Effort
   - d. CASE Studies on CASE
   - e. Short and Long Term Benefits
8. **Related Technologies**
   - a. CASE's Dominant Role
   - b. Software Reusability as a Development Methodology
   - c. Role of COBOL
   - d. Absorption on Fourth Generation Technologies
   - e. Incorporation of Fifth Generation Technologies
   - f. Emerging Issues
9. **Future Trends**
   - a. Habitable Environment – Beyond User Friendly
   - b. Intelligent Training Systems
   - c. Intelligent Methodology Drivers
   - d. Software Reusability – Key to High Productivity

AMERICAN MANAGEMENT SYSTEMS

AMS is a major computer services firm specializing in applications development. AMS's Lifecycle Productivity System (LPS) integrates productivity tools from AMS and other vendors for strategic system planning, design, development, maintenance, and project management. LPS produces all deliverable work products required by most methodologies. Major portions of LPS operate on PC's. Implementation, configuration control, and foundation software modules operate on IBM mainframes.

ARTHUR ANDERSEN

Arthur Andersen & Co. is a worldwide professional services organization engaged in accounting and auditing, tax consulting, and management information consulting. Arthur Andersen will demonstrate a DESIGN/1 PC based planning and design front end to the firm's computer-integrated software engineering environment. DESIGN/1 supports requirements gathering, data modeling, process design, and prototyping using IBM PC-compatibles and various LANs.

ARTHUR D. LITTLE, INC.

The PC-Based tool IRMA (Information Resource Management Aid) supports Arthur D. Little's methodologies for strategic systems planning and data modeling, as well as structured analysis and prototyping. The planning methodology relates business objectives to systems opportunities. The tool has advanced data modeling features and interfaces with DB2, IMS, IDMS, and Datacom.

ARTHUR YOUNG & COMPANY

Arthur Young is an international accounting, tax and management consulting firm and is working with KnowledgeWare to develop the Information Engineering Workbench (IEW). In addition to using the IEW for systems building and marketing the products internationally, the AY/IEW was developed to provide methodological and management underpinnings for information engineering.

ASYST TECHNOLOGIES, INC.

The DEVELOPER workbench software provides a generic multi-user automated support for the entire systems development process. As opposed to a methodology driven tool, The DEVELOPER allows the use of any methodology at all desired levels of compliance and rigor. Its Customizer module, coupled with its Import/Export functions, allows an easy link to other products such as code generators and central data dictionaries.

THE CADWARE GROUP, LTD.

CADWARE is an OEM supplier of TOOLS for the Engineering Information Systems. All TOOLS operate on IBM/XT/AT, AT & T 6300, Wang PC and other IBM compatibles using a proprietary rule-based technology. With RULE TOOL, experts create rule-based modeling methodologies and use the Design Graphic System environment for Rule checking. Complete Model Data may be transferred to COMPANION APPLICATIONS, e.g., Data Dictionaries, Simulators and Code Generators.

CAP GEMINI SOFTWARE PRODUCTS, INC.

CAP Gemini exists exclusively to market the MultiPro System. MultiPro is an application development environment integrating PC-based workstations into the IBM mainframe environment. MultiPro is an open system, tailorable to any development life cycle and it uniquely addresses the business aspects of system development. MultiPro automates aspects of the analysts workstructure, consolidating project documentation within its mainframe resident Project Library System.

CGI SYSTEMS, INC.

PACBASE is a full life-cycle CASE product. It integrates: Mainframe and PC based analysis and design workstations for the development and maintenance of application specifications through active prototypes, a centralized, enterprise-wide dictionary that controls and manages all business specifications, and generators which transform the dictionary-based specifications directly into complete COBOL applications, including all code and documentation.

CHEN & ASSOCIATES, INC.

Chen & Associates, Baton Rouge, Louisiana, is a leading company providing products, training, and consulting in data-oriented system development. Products (PC-based) to be presented are: ER-Designer, which defines your information requirements in Entity-Relationship diagrams; SchemaGen, which generates schemas for your database systems (from micro-based to mainframe-based): Normalizer, which normalizes data records.

CORTEX CORP.

CorVision is an application development system that automates the entire software development life cycle for the DEC VAX/VMS environment using a technique called Picture Programming. Picture Programming allows DP professionals to visualize an application by diagramming the design and then automatically generating a production-ready application directly from the pictures. CorVision is built on application generator technology for the DEC VAX, Application Factory.

CULLINET SOFTWARE, INC.

Graphics based PC design tool which aids in the logical design and physical implementation of databases and applications. Product supports Entity modeling, DFSs, Normalization up to 3NF, conversion of Normalized relations into Logical Data Structures, and the automatic generation of DDDL syntax. Communications link allows definitions of schemas, maps, dialogs, and applications defined on the PC to be uploaded to HOST computer.

D. APPLETON COMPANY, INC.

D. Appleton Company (DACOM) solves business responsiveness problems by applying asset-management principles, practices, and tools to information. DACOM methodologies for information system planning, RAP, and development, PDM, when coupled with Data Resource LEVERAGE (data and activity modeling with the JANUS software), enables teams of professionals to use and reuse data assets for improved productivity.

PRODUCT PRESENTATIONS

The Computer-Aided Software Engineering Symposium (CASES) is a unique way to anlayze the many products available in this new and growing technology. You can compare and contrast products while each is still fresh in your mind. On Day One the seminar leader will present a classification system for the various products, which will help you effectively allocate your time among the presentation.

We are fortunate to have the leading vendors in this technology presenting their products. These companies will make detailed, functional one-hour presentations and be available to discuss their products with you. Each company appearing at the Symposium has provided us with a concise description of the product(s) they plan to present. These descriptions appear on the next few pages of this brochure. To get the most out of the product presentations you should spend a few minutes reviewing the participating companies and the product(s) they will discuss.

PRESENTER	PRODUCTS
American Management Systems	LIFE-CYCLE PRODUCTIVITY SYSTEM
Arthur Andersen & Co.	DESIGN/1
Arthur D. Little, Inc.	IRMA
Arthur Young & Co.	INFORMATION ENGINEERING WORKBENCH
ASYST Technologies, Inc.	THE DEVELOPER
The CADWARE Group, Ltd.	RULE TOOL
CAP Gemini Software Products, Inc.	MULTIPRO
CGI Systems, Inc.	PACBASE
Chen & Associates	ER-DESIGNER, SCHEMAGEN, NORMALIZER
Cortex Corp.	CORVISION
Cullinet Software	CASE PRODUCT
D. Appleton Co., Inc.	DATA RESOURCE LEVERAGE, RAP, PDM
Data Architects, Inc.	EXSYS
Digital Equipment Corp.	INTEGRATED APPLICATION DEVELOPMENT TOOLS
DISUS	DEFT
Higher Order Software, Inc.	USE.IT
Index Technology Corp.	EXCELERATOR, EXCELERATOR RTS, CUSTOMIZER
InfoModel	CASE PRODUCT
James Martin Associates	INFORMATION ENGINEERING METHODOLOGY
Ken Orr & Associates, Inc.	DESIGNMACHINE
KnowledgeWare, Inc.	INFORMATION ENGINEERING WORKBENCH
Learmonth & Burchett Management Systems, Inc.	AUTO-MATE PLUS
Manager Software Products	MANAGER/MANAGERVIEW
McDonnell Douglas IST	PROKIT WORKBENCH
Meta Systems, Ltd.	PSL/PSA, STRUCTURED ARCHITECT, STRUCTURED ARCHITECT – INTEGRATOR
Nastec Corp.	DESIGNAID
Netron, Inc.	NETRON/CAP
Pansophic Systems, Inc.	TELON
Phoenix Technologies, Inc.	PRE-C, PFIX86PLUS, PFORCE, PLINK86PLUS, PSOURCE
Polytron Corp.	POLYMAKE, POLYLIBRARIAN
Rand Information Systems, Inc.	RAND DEVELOPMENT CENTER (RDC)
Sage Software, Inc.	APS DEVELOPMENT CENTER
Softlab, Inc.	MAESTRO
Technology Information Products, Inc.	TIP CREATE, TIP DEFINE, TIP PLAN, TIP RELATE
Tektronix Inc.	INTEGRAL CASE SYSTEMS SOLUTIONS
Texas Instruments	INFORMATION ENGINEERING FACILITY
Transform Logic Corp.	TRANSFORM
Visual Software	VS-DESIGNER
Yourdon	ANALYST DESIGNER TOOLKIT, COMPOSE, RULE TOOL

DATA ARCHITECTS, INC.

Data Architects, Inc. (DAI) is a systems consulting firm that offers both customized and packaged solutions to its international client base. DAI and EXSYS Inc. will demonstrate EXSYS – the Expert System for business software development. EXSYS makes possible the development of systems directly from statements of facts in English. EXSYS eliminates programming and combines analysis, design, and testing into a comprehensive one-step development approach. EXSYS is the one product which supports the entire life cycle.

DIGITAL EQUIPMENT CORPORATION

As a leading computer manufacturer, Digital provides a range of integrated Application Development tools for solutions to business and engineering problems. The unique offerings are workstation based and address all aspects of the Applications Development Life Cycle. They are integrated into the VAX hardware, software, and network architecture to provide enterprise-wide solutions.

DISUS

Deft is a suite of Computer Assisted Software Engineering (CASE) tools, widely used for systems analysis/design in North America and Europe. Deft supports dataflow, program-structure and entity-relationship diagrams, a data dictionary and forms design. Development projects using Deft have reported significant productivity gains in all phases of system building: analysis, design, development, documentation and maintenance.

HIGHER ORDER SOFTWARE, INC.

USE.IT is a Computer Aided Software Engineering product for specification, design, analysis and automated code construction. It is mathematically based. Designers use "computable" graphics. USE.IT performs logical analysis and produces source code (COBOL, C, Pascal and FORTRAN) and documentation. Available for mainframes (VAX and IBM) and the IBM PC.

INDEX TECHNOLOGY CORPORATION

Index Technology Corporation, the leading developer of CASE tools that automate the software development life cycle, is the creator of Excelerator, Excelerator/Real Time Systems and Customizer. Excelerator and Excelerator/Real Time Systems are used in the early phases of the software development life cycle to produce, analyze, modify, and generate specifications documents. Customizer, tailors Excelerator and Excelerator/Real Time Systems to your organization's development standards and interfaces with external facilities.

INFOMODEL

InfoModel is an information engineering company that has developed a comprehensive methodology for information resource management, systems development, and information systems planning. To support this methodology InfoModel IBM PC software has been developed. InfoModel will present an overview of its methodology and the capabilities of its product.

JAMES MARTIN ASSOCIATES

James Martin Associates is a consultancy specializing in improving productivity and quality in system development. CASE tools can be applied successfully only within a disciplined, consistent and complete development approach. JMA will present the techniques and tasks of the Information Engineering Methodology.

KEN ORR & ASSOCIATES, INC.

Ken Orr & Associates, Inc. specializes in building integrated software engineering environments that incorporate technology, tools, and training for maximum productivity. The DesignMachine is an IBM PC-based CASE tool that automates the requirements and analysis phase of systems development. It automatically generates design deliverables from system requirements recorded in an integrated design database. It has embedded software engineering rules and built-in quality control.

KNOWLEDGEWARE, INC.

KnowledgeWare, Inc. develops, manufactures, and distributes expert-system, knowledge-based software tools for information engineering. The Information Engineering Workbench/Workstation uses advanced CAD/CAP techniques that are integrated through the Encyclopedia (a knowledge-base) and an expert-system module to create, verify and revise diagrams on the computer screen making it truly unique among computerized analysis tools.

LEARMONTH BURCHETT MANAGEMENT SYSTEM (LBMS), INC.

LBMS, Inc. experts in information systems development will demonstrate AUTO-MATE PLUS, a PC based tool, which provides full support for developing systems using graphics, form documentation, reports, an integrated design database, and on-line data normalization. In addition, AUTO-MATE PLUS automatically transforms logical data models into physical designs for IDMS, ADABAS, or DB2.

MANAGER SOFTWARE PRODUCTS (MSP)

MSP is the world's leading vendor of Data and Information Resource Management Technology. The MANAGER Family of Products is dedicated to supporting all phases of the Systems LifeCycle, from Strategic Information Planning to the generation of enabled code. Along with the MANAGER Family, MSP will be presenting managerVIEW, the Intelligent Workstation based Graphical Information Engineering tool driven by the mainframe resident Corporate Dictionary.

McDONNELL DOUGLAS INFORMATION SYSTEMS GROUP

McDonnell Douglas Information Systems Group is focused on providing single-source solutions representing a tailored framework for software engineering. ProKit WORKBENCH is a new IBM PC-based information system that automates the application of proven structured techniques to the strategic systems planning, analysis, and design phases of the system life cycle.

META SYSTEMS, LTD.

Meta Systems, Ltd. offers integrated micro/mainframe-based productivity (CASE) software, which completely automates the entire process of developing information systems. Our customers include some of the world's most prestigious companies and government/military organizations. They use PSL/PSA (host based), Structured Architect (PC graphics tools), Structured Architect – Integrator (on the host), and other Meta tools to develop large and complex systems, to reverse engineer old code, and to do enterprise wide data modeling.

NASTEC CORPORATION

Nastec Corporation, originators of the CASE tools concept, develop tools for both commercial and aerospace/defense/engineering software developers. The DesignAid analyst/programmer workbench is a multi-user development system operating in the IBM PC and DEC/VAX environments. DesignAid automates software development from requirements definition through code generation, including documentation development and project management.

NETRON INC.

The NETRON/CAP Development Center is a CASE system for building custom, portable COBOL software using a frame-based software engineering process called Bassett Frame Technology. NETRON/CAP unifies the prototyping/development/maintenance life-cycle into an automated specification procedure. The open design architecture allows unlimited automation of additional application functionality. For IBM mainframes and PCs, VAX systems and Wang VS minis.

Days 2, 3: Product Presentations

PANSOPHIC SYSTEMS, INC.

Pansophic Systems Inc., a leading vendor of software products to improve application productivity and control, will present TELON. The TELON application development system captures design specifications to generate COBOL or PL/1 applications. TELON assists the transition from analysis to design by providing interfaces to leading front end analysis tools. TELON components include: Directory, Data Administration, Screen/Report Painters, Prototyping, Specification Facilities, Automated Documentation, Generator, and Test Facility.

PHOENIX TECHNOLOGIES, LTD.

Phoenix, known worldwide for professional programmers tools such as Pre-C, Pfix86plus and PforCe, offers a full line of high-performance, easy-to-use micro-development tools that help programmers more efficiently deliver the best applications possible. Plink86plus, the only linkage editor with advanced capabilities, is considered the industry standard. Psource, Phoenix's recently announced software development management system, provides control and reporting capabilities previously available only on mainframe and minicomputer systems.

POLYTRON CORP.

POLYTRON offers the leading configuration management system for MS/DOS PC and VAX/VMS software development. PVCS maintains versions and revisions of software systems. PolyMake automatically rebuilds any desired version of the system. PolyLibrarian maintains libraries of reusable object modules. The tools work together or independently, with ANY language and your existing tools.

RAND INFORMATION SYSTEMS, INC.

Rand Information Systems, Inc., a computer software and services company, specializes in productivity software and system development. The Rand Development Center (RDC) is a programmer workbench and tool management framework which supports application development under the most popular TP monitors and data base management systems in the IBM mainframe environment.

SAGE SOFTWARE, INC.

Sage Software, Inc. develops, markets and supports the APS Development Center (APS). APS products comprise an integrated family of computer-aided software-engineering (CASE) tools for IBM Development Centers. APS products encompass the software development life cycle and support drawing, prototyping, generating, testing, and maintenance of COBOL-based application.

SOFTLAB, INC.

Softlab, Inc., will present MAESTRO, the integrated Software Engineering Environment. MAESTRO organizes and manages the software cycle through real-time project management, time accounting, and your unique standards. MAESTRO integrates customizable tools for design, coding, testing, documentation, and maintenance; is language independent; and fits in numerous hardware and software environments.

TECHNOLOGY INFORMATION PRODUCTS

TIP provides completely integrated methodologies and software for system planning, analysis, design, implementation, and maintenance. TIP PLAN helps identify, define, and schedule the systems and data bases needed to meet a business' goals and objectives. TIP DEFINE graphically describes a system's functional and information requirements. TIP RELATE automates building the normalized relational data model. TIP CREATE then generates COBOL/PLI programs.

TEKTRONIX, INC.

Tektronix, Inc., has participated in the evolution of the computer-aided software industry for over a decade. Tek already has an established CASE base in the engineering and scientific market sectors; and is currently exploring other opportunities and applications. Tek's family of software development tools is named "Integral CASE Systems Solutions."

TEXAS INSTRUMENTS

Texas Instruments' integrated CASE product, The Information Engineering Facility, is designed to automate the complete systems development life cycle. It consists of a powerful mainframe encyclopedia and PC-based, graphical toolsets to support analysis and design. TI can demonstrate today the major components of this product including: strategic planning, analysis, design, COBOL code generation, and database generation.

TRANSFORM LOGIC CORPORATION

Transform Logic Corporation's TRANSFORM product family automates COBOL application software design, development and maintenance in IBM mainframe environments. Transform Logic will present the concepts behind development automation and application base management using TRANSFORM. Data driven design architecture, environment independence, and design prototyping are features of this approach.

VISUAL SOFTWARE, INC.

Visual Software, Inc. develops and markets an integrated family of personal CASE tools for the multi-user IBM PC environment. The VS-Designer is the first CASE workbench to support different methodologies simultaneously from an information repository. Visual's unique intelligent architecture for personal adaptability enables the product to adapt to standard user-defined methodologies. It further reduces the learning curve by modifying the user interface to operate like well known word processors.

YOURDON, INC.

Yourdon currently offers three IBM PC-based CASE tools for developing commercial and real-time systems. The Yourdon Analyst/Designer Toolkit offers cost effective automation of Yourdon Structured Analysis and Design Methods. COMPOSE is an easy-to-use text formatter for the creation of your deliverable documents, and Rule Tool allows you to customize the Analyst/Designer Toolkit to support your organization's own design methods and standards.

By attending CASE you will Learn How:

- CASE technology applies to software development the same rigorous engineering procedures that have been successfully used in CAD/CAM technology.
- CASE technology is fundamentally different from third- or fourth-generation technology.
- The components of CASE technology make it superior to existing technology.
- To evaluate and compare CASE products.
- To incorporate CASE technology within your current development methodology.
- AND WHO THE KEY PLAYERS ARE IN COMPUTER-AIDED SOFTWARE ENGINEERING.

CASE Technology Revolutionizes and Improves Software Development By:

1. Giving MIS management more control over projects.
2. Providing an environment that supports the entire development life process.
3. Freeing the systems analyst by providing automated tools to support the creation of design diagrams, data models, and system definitions.
4. Providing powerful graphical design aids to define and document software systems.
5. Utilizing interactive prototyping techniques to clarify user requirements and to ensure that developed systems meet user needs.
6. Capturing design information in sufficient detail required for automatic code generation.
7. Verifying and validating functional specifications to detect errors and inconsistencies.
8. Promoting reuseability of software components and other software deliverables.
9. Providing automatic documentation facilities that are continually up-to-date and that are guaranteed to be consistent with systems specifications.

GUEST SPEAKERS

ALBERT F. CASE, JR.
Guest Speaker

Albert F. Case, Jr., a nationally known lecturer and author, is Director of Technology Transfer for Nastec Corporation, a Computer-Aided Software Engineering firm. Mr. Case has spoken at many national conferences on software development. In 1986, Mr. Case was elected to the ACM National Lectureship Program. His articles have appeared in numerous publications including *Computerworld, System Development,* and *Data Management* (the DPMA journal). His most recent book, *Information Systems Development: Principles of Computer-Aided Software Engineering* was published by Prentice-Hall in 1986. His new book, *Team Systems Analysts,* will be published by Prentice-Hall in 1987.

DR. PETER CHEN
Professor, L.S.U. and M.I.T.
Founder, Chen & Associates, Inc.

Dr. Peter Chen is internationally known for his original work on Entity-Relationship (ER) approach to systems analysis and database design, which has been used widely all over the world. He is Foster Distinguished Chair Professor of Computer Science, Louisiana State University, Baton Rouge and is, currently, Visiting Professor at Department of Electrical Engineering and Computer Science, M.I.T., Cambridge, Mass. He is also the founder of Chen & Associates (Baton Rouge, Louisiana), a firm providing tools, consulting, and training in systems analysis and design.

Dr. Chen received his Ph.D. from Harvard University in 1973. He served on the management school faculties of MIT and UCLA before moving to LSU in 1983. He spent one year at Honeywell and one summer each at IBM and DEC in the early seventies working on advanced computer system projects. He has edited four books and published many articles. He is the Editor-in-Chief of *Data & Knowledge Engineering,* published by North-Holland. He has also served as consultant to many corporations and lectured worldwide.

WHO SHOULD ATTEND

- MIS Directors & DP Managers
- Data Base Administrators
- Application Developers
- Application Systems Managers & Analysts
- Systems Planners
- Executives & Senior Management
- Departmental Managers
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- Systems Designers

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KEN ORR
President
Ken Orr & Associates, Inc.

Ken Orr is President of Ken Orr & Associates, Inc., which specializes in software engineering environments that integrate technology, tools, and training for maximum productivity. As one of the principal developers of the Data Structured Systems Development (DSSD) methodology, he directs all research and development activities for advanced DSSD technology and computer-aided software engineering (CASE) tools.

Orr is a leader in the systems technology "structured revolution", the forefront of the information science field. With a mathematics background, he's held key positions in management consulting, state government, and software development. He currently consults with major clients – including Pacific Telesis Group, Bell Communications Research, and Santa Fe Railway – on strategic systems planning, data architecture, and CASE.

A frequent speaker at international conferences and seminars specializing in systems planning and development, Ken is the author of *Structured Systems Development, Structured Requirements Definition,* and *The One Minute Methodology.* He has also been a contributing editor to INFOSYSTEMS magazine and has written for COMPUTERWORLD, SOFTWARE NEWS, and other industry trade publications.

EDWARD YOURDON
Vice-President of Planning
DeVry, Inc.

Edward Yourdon is Vice-President of Planning for DeVry, Inc., the educational subsidiary of Bell & Howell. Mr. Yourdon has worked in the computer industry for nearly 25 years, including positions with Digital Equipment Corp., and General Electric. He has worked on some 25 different mainframe computers and been involved in a number of pioneering projects.

In 1974, Mr. Yourdon founded his consulting firm, YOURDON, Inc., to provide a forum for educational, publishing and consulting state-of-the-art technology in the computer field. As chairman of the company, he oversaw an operation that trained over 100,000 people in major companies and government agencies around the world. He is the author of 14 computer textbooks, his most recent entitled: *Nations at Risk: The Impact of the Computer Revolution,* which has been excerpted in computer journals in the United States and throughout Europe. Several of his books have been translated into Russian, Japanese and a number of other languages. His articles have appeared in virtually all of the major computer journals, and he is a regular speaker at major computer conferences.

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Tools of the trade: Is CASE really a cure-all?

BY JIM HULING

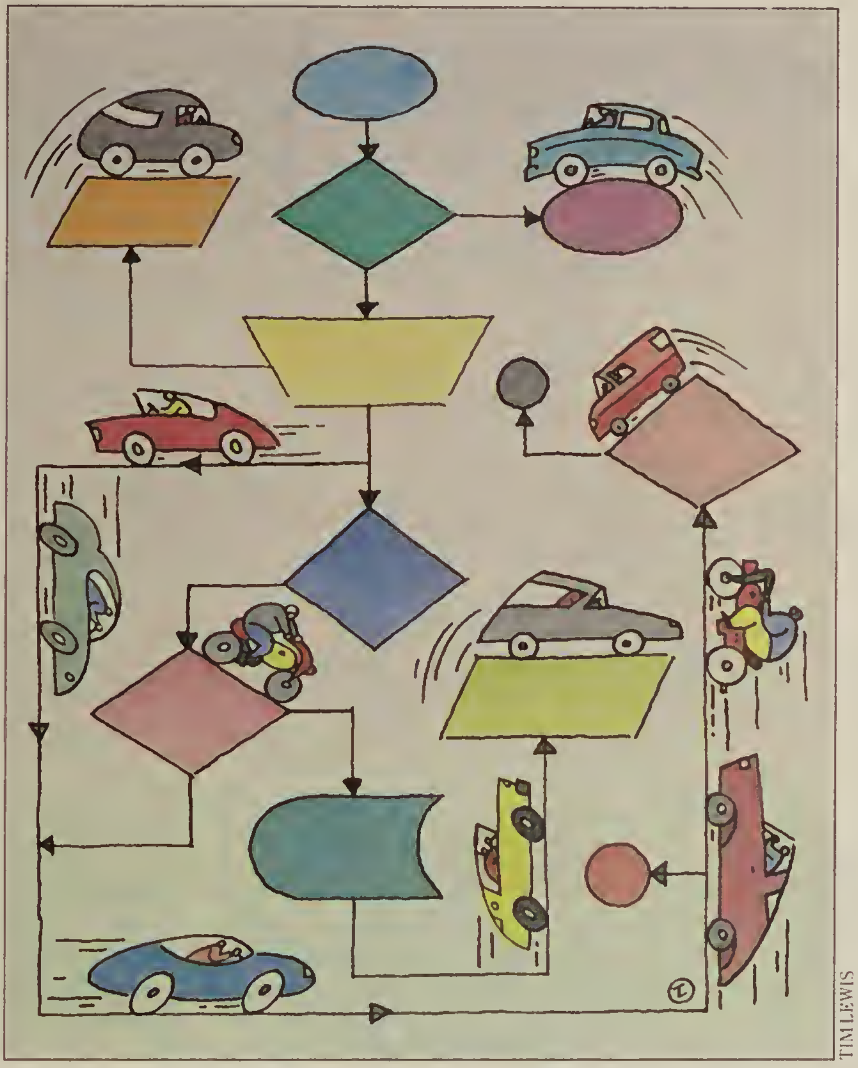
“Welcome to the CASE revolution,” proclaimed the ebullient keynote speaker at a recent symposium covering computer-aided software engineering (CASE).

While well meant, those words may not have been well chosen for a technical audience ever watchful of marketing hype and still reeling from the past “revolutions” of fourth-generation languages, relational data bases, structured programming and real-time systems.

Let's face it: The idea of going through yet another revolution, real or fabricated, is somewhat less than appealing to most MIS managers. What MIS should find appealing about CASE, then, is that its tools, which were created to ease and integrate the design, generation and maintenance of systems, do not really represent a revolution but rather an evolution of tools and concepts that MIS has already embraced in the systems-development life cycle.

The methods CASE tools support are those of structured analysis, design and development — techniques whose benefits have long been recognized in the industry.

With that information in mind, what MIS managers must do is decide if acquiring a CASE product should be the next step in their continuing efforts to develop better systems. The answer lies in understanding the products' benefits and in examining the major problems in using them.



TIM LEWIS

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Arco taps Excelerator for data modeling
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The big decision

Also realize that when you are considering purchasing a CASE tool, you are about to face what may be the most difficult software decision you will ever make. These products are relatively new and, like most products in rapidly growing markets, are changing constantly.

What also complicates the acquisition process is that the CASE needs of the MIS organization may be difficult to define. Unlike applications software, which often supports business functions of a more stable nature, CASE products must support a process that can vary dramatically according to the individuals involved.

In addition, the selection of a CASE product, much more than the selection of other software, must be based largely on what its future direction and ultimate functionality will be (see story page 81).

Many components of these systems are not new to the industry. For example, graphics tools that support the drawing of diagrams and code generators that can produce modular units of program source code have been commercially available for some time.

What is new is the concept of a functionally complete, fully integrated tool that would support the entire systems-development life cycle. But while most CASE products represent a significant improvement from the older, stand-alone components, few are able to completely fulfill the concept's promise.

The principal components most CASE products offer today, or will offer someday, can be grouped into the following categories: diagraming tools, including data-flow and data-structure diagrams as well as program-structure charts; syntax verifiers; information repositories; prototyping tools, including menu, screen and report generators; code generators; life-cycle methodologies; and project management tools (see story page 74).

On the plus side

Although their functional capabilities vary widely, some CASE products available today offer significant benefits. The following are among the most important.

- CASE products automate many of the manual tasks of systems development. By using diagraming tools that provide special keys for creating each symbol and then allowing the analyst to change the size, shape and color of the symbols as well as add textual descriptions, CASE products can make development easier and more accurate.

Also, in the past, analysts were as reluctant to change neatly drawn diagrams as they were to revise the subsequent design. By automating the redrawing process, the analyst can more easily incorporate revisions and reproduce the diagrams. He will be more willing to

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Huling is a senior consultant with the Birmingham, Ala., office of Ernst & Whinney, an international auditing, tax and consulting firm.

CASE tools

FROM PREVIOUS PAGE

explore options and alternatives and will ultimately produce a better final product.

- CASE products can generate significant portions of the system's documentation automatically, using the information captured during the analysis process. Data-flow diagrams, data models, structure charts and the data specifications contained in the information repository can form significant sections of the system's final documentation.
- CASE products can provide greater standardization.

Each analyst, while agreeing with some components of a particular methodology, will usually, in the end, adhere to his own development process. But the MIS manager wants to provide a standard methodology that possesses sufficient incentives and proper enforcement mechanisms to ensure that analysts use it. CASE products, by providing a methodology integrated with a set of automated tools, offer analysts a means of obtaining the greatest benefit possible from the tools. Products that contain or interface with project management tools can also enforce the methodology by incorporating its steps into the overall project plan and follow up by tracking their completion.

- CASE products can provide greater consistency and coordination in large-scale and medium-scale development projects. Even within the steps of a single methodology, different analysts can produce their own diagrams and documentation that, ultimately, are difficult to integrate into a total analysis.

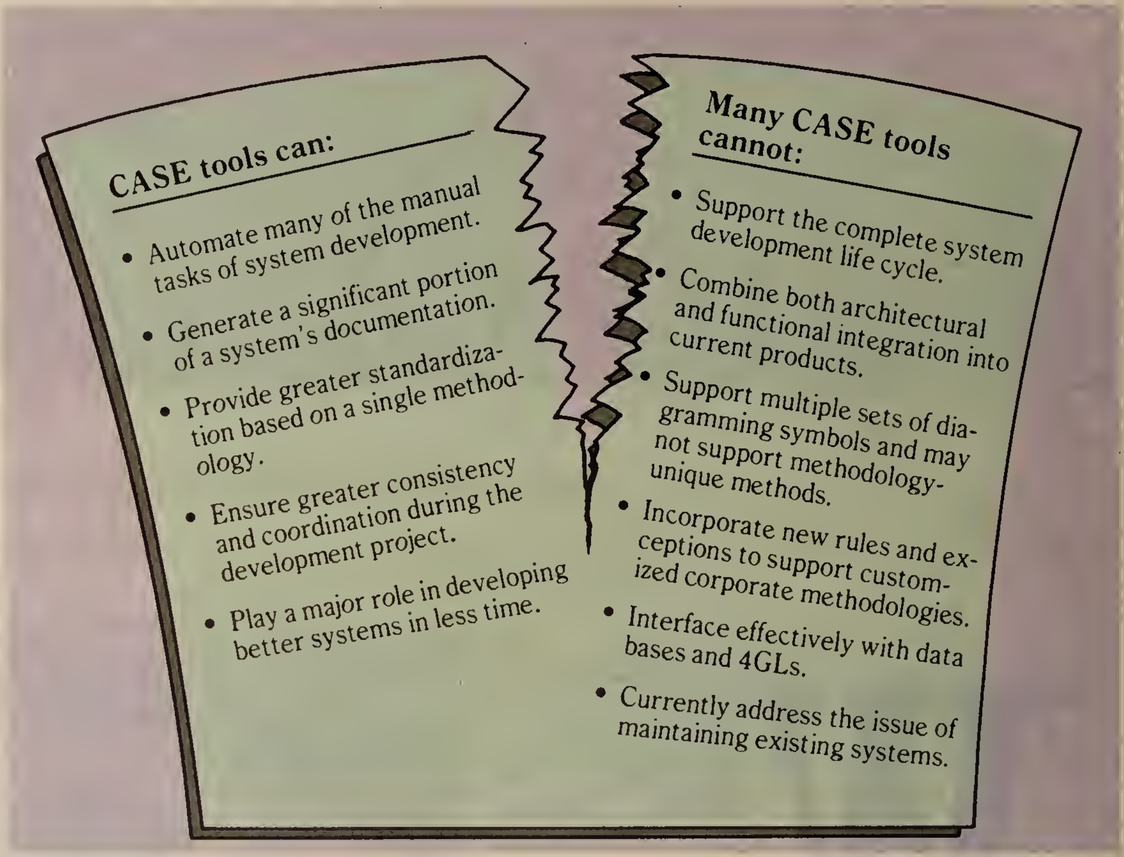
On the other hand, the CASE tools provide a standard set of diagraming symbols, specific requirements for documenting information flows and a common information repository. In addition, because the CASE product represents a single information resource for all byproducts of the analysis and design, the coordinating MIS manager can readily access the complete specifications, even though they may have been originally created by more than one analyst.

- Overall, CASE products can play a major role in developing better systems in less time, partly because the

Continued on page 76

Pros and cons of CASE tools

While CASE tools offer significant benefits, they are not yet a panacea. Because they are still evolving, a number of technical issues have yet to be resolved.



CASE tools can:

- Automate many of the manual tasks of system development.
- Generate a significant portion of a system's documentation.
- Provide greater standardization based on a single methodology.
- Ensure greater consistency and coordination during the development project.
- Play a major role in developing better systems in less time.

Many CASE tools cannot:

- Support the complete system development life cycle.
- Combine both architectural and functional integration into current products.
- Support multiple sets of diagramming symbols and may not support methodology-unique methods.
- Incorporate new rules and exceptions to support customized corporate methodologies.
- Interface effectively with data bases and 4GLs.
- Currently address the issue of maintaining existing systems.

CW CHART: MITCHELL J. HAYES

Key elements of CASE kits: Prototyping, code generators

A computer-aided software engineering (CASE) tool kit contains a variety of instruments. The principal components offered today, or planned for tommorrow, fall into several categories.

Diagraming tools

The cornerstone of many CASE products is a graphics tool that the systems analyst uses to draw the various symbols associated with a particular methodology and then enhance that drawing by adding size, color and text.

Most products support three basic types of diagrams:

- Data-flow diagrams provide symbols for the various processes and flows of information that make up a function. As a result, they help the analyst describe the logical operations of an entire organization or its smallest department. Data-flow diagrams are easily decomposed into increasingly higher levels of detail while maintaining consistency and traceability.
- Data-structure diagrams indicate not only individual data elements but their intricate relationships as well.

As with data-flow diagrams, they help the analyst record and refine relationships among the data in increasingly higher levels of detail and are effective for exploring alternative data structures.

- Program-structure charts create a functional road map of the system prior to coding. At their highest level, these charts may indicate the flow of planned programs within the system's overall architecture. At the individual program level, program-structure charts allow the analyst to describe the functions of the program in a hierarchical structure and provide the detailed information needed to begin structured programming.

Syntax verifier

Most CASE products support a particular structured analysis and design methodology. Whether the methodology is that of Yourdon, DeMarco, Gane and Sarson, Warnier-Orr or others, it will most likely possess its own set of diagraming symbols and rules governing their use. An important component of CASE products is the ability to verify the accuracy and completeness of the information that is entered into the system, according to these rules.

Particularly in large projects in which more than one analyst may be involved, it is essential to enforce a standard in both diagrams and data specification. Some products provide syntax checking when information is entered, while others perform this function as an altogether separate process. In either method, syntax verification should apply to individual diagrams and the combination of diagrams and data information that make up each system.

Information repository

The heart of most CASE products is a central information repository, often referred to as an encyclopedia. This information resource goes beyond the typical functions of a data dictionary by providing a mechanism for storing all types of system information.

For example, screen and report layouts, pseudo code, documentation and project schedules may be stored, in addition to diagrams and data specifications. The principal benefit of this component is that it coordinates, integrates and standardizes the different types of information and makes them easily accessible to the analyst.

Prototyping tools

These tools go beyond diagraming and specifications to present the analyst with a working model of the system. They also give the user a tangible representation of the system. Most CASE products provide three principal prototyping tools:

- Menu generators construct a series of menus outlining the eventual components of the system. These menus may be linked to other menus to illustrate the user path through the system or to actual screens that may be used for data entry or inquiry.
- Screen generators allow the analyst to paint the desired layout and content of a screen without entering complex formatting and data specifications. With the information repository, data fields may be quickly indicated, edited and moved to various screen locations.
- Report generators, similar to screen generators, begin with a blank screen and then simply indicate what information the report should contain and in what format. In addition, they can indicate totals, paging, print edits and sequencing in creating samples of the system's reports.

Code generators

Code generators are an important component of CASE for two reasons. First, they enable the analyst to generate modular units of source code from high-level specs. The code generators of some CASE products use icons to indicate various functions in the program modules and data-defined flows of information and then translate these symbols into programs. Using code generators, the analyst can specify the system, generate code, test the system, revise specifications and generate the code again. Although many generators cannot accommodate complex system specs, they can provide a mechanism for creating prototypes that are more detailed and easily modified.

Second, code generators provide for the creation of reusable code. Within most systems there are a number of standard modular functions. By retaining and identifying the specifications of these modules, the analyst can often configure significant portions of a new system by simply reusing these components.

Life-cycle methodology

The components discussed so far relate to steps in the systems-development life cycle. An equally important component is integrating these individual tools into an overall methodology.

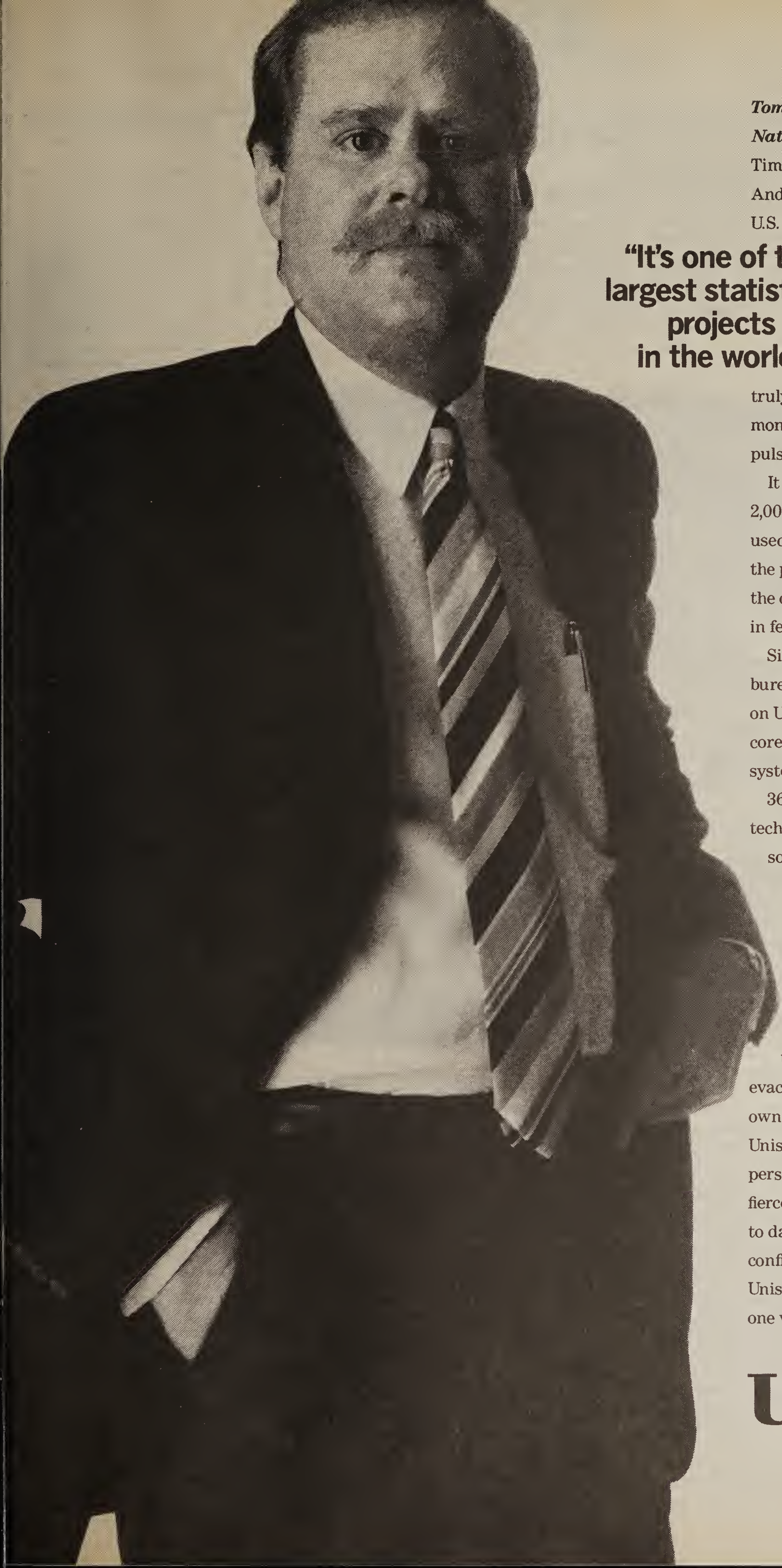
Some CASE products provide the detailed steps of an entire life-cycle methodology through checklists or narratives. In addition to guiding the analyst through the process, this provides a mechanism for monitoring and controlling the entire project. Although this may limit the analyst to one methodology, some products change or delete existing steps and add new ones as required to address the organization's own requirements.

Project management tools

Controlling the development of a new system is often as challenging as the system's analysis and design. A critical component not widely available in CASE products today is a set of project management tools. Some CASE products integrate their components with popular stand-alone project management tools, while others will develop these capabilities for future releases.

In either case, the integration of project scheduling and resource estimation tools for example, will be critical to CASE products' supporting the systems-development life cycle. •

JIM HULING



Tom Wilson,
National Account Manager, Unisys

Time and tide wait for no man. And no one knows better than the U.S. Census Bureau.

"It's one of the largest statistical projects in the world."

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It all adds up to more than 2,000 reports a year which are used for everything from the planning of bus routes to the distribution of $7 billion in federal aid.

Since 1951, the bureau has relied on Unisys for its core information systems.

"14 years of upgrades without software conversions."

36 years of changing technology and not one stop for software conversion in the last 14 years.

The system did stop, though, for a major water leak that flooded three mainframes. Tom Wilson did the only gentlemanly thing. He evacuated his own office at Unisys so Census personnel, with fierce adherence to data confidentiality, could work with Unisys computers until their new one was installed.

"I keep a pair of rubber boots in the office just to remind me."

UNISYS
The power of 2

CASE tools

FROM PAGE 74

analyst can be more productive with the prototyping and code generation processes.

The ultimate benefit of CASE products is the potential development of systems that will more effectively meet the requirements set forth by the organization. By automating significant functions of the analysis, CASE products can allow the analyst to concentrate on more accurately defining the specifications. And, by enforcing a structured systems-development process, the tools can help the analyst develop a more efficient system. Moreover, when the system is finally delivered, a CASE product can provide easier maintenance and enhancements throughout the system's life.

Neat, simple and wrong

According to H. L. Mencken, "For every problem there is one solution which is simple, neat and wrong." For the MIS manager who focuses exclusively on the benefits, CASE products may appear to provide his company with a simple and neat solution to every systems-development problem. It may also be the wrong solution.

You must weigh the benefits of CASE products against their disadvantages. Unfortunately, current advertising focuses on the benefits of a single product that supposedly will support the entire life cycle. Although the benefits may appear obvious, the extent to which current products offer them varies considerably.

Because the evolution of the CASE products is not yet complete, you must gain a clear understanding of the actual functions and capabilities currently available and consider them as a part of a vendor's long-term direction for a product. Your purchase should represent an investment in the future of a product that will ultimately provide effective support for your organization's entire systems-development life cycle.

The trouble with CASE

In evaluating both the current functionality of the product and its future direction, you should always be aware of the following trade-offs of using CASE products.

- Incomplete functionality. Many CASE products do not yet support the complete systems-development life cycle. Some offer only a single component, while others combine a mature, functionally significant element with other recently developed and loosely coupled components that may be less complete. You must evaluate both the exact combination available and the functional maturity of each component.

> BY focusing exclusively on the benefits, CASE products may appear to provide a simple solution to every systems-development problem. It may also be the wrong solution.

- Lack of integration. Two types of integration are important in a CASE product: architectural and functional. Architectural integration means that the combination of components should appear as one product to the analyst. For example, all components should be accessed through a common entry point such as a master menu.

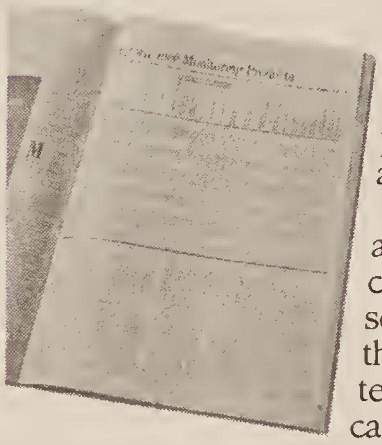
In addition, Help and other major function keys should be the same when possible, and the analyst should have the capability of storing information in a single repository from any component.

With functional integration, the analyst should only be required to enter a piece of information a single time. What this means is that each tool must be able to pass information — in the correct format and with the proper meaning — to the next tool.

The complete delivery of both types of integration has not passed from conception into

Continued on page 78

In SPOTLIGHT, the buyer's guide to the computer world.



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COMPUTERWORLD

USER INTERVIEW

Pacbase pros and cons

Allied Van Lines, Inc., the Illinois-based transportation firm, completes all new development with Pacbase, a CGI Systems, Inc. CASE workbench tool. Pacbase helps control unstructured development work and lets Susan Bennett, data administrator for Allied, keep the data dictionary consistent.

Bennett spoke recently with *Computerworld* Senior Editor Janet Fiderio.

Describe Pacbase.
It's a Cobol generator that features a series of fill-in-the-blank screens. The programmers create screen layouts or report layouts, and it generates basic skeleton programs. The next step is filling in the cryptic patterns of the fill-in-the-blank parameters.

The programmers do that in place of writing code, which develops the next step. For a last option, used if the program is too sophisticated to handle what Pacbase can produce generically, procedural code is available. This is shorthand Cobol.

All those pieces are put together and run through a precompiler, and Cobol source code is produced and compiled like any other Cobol compile.

So Pacbase will give you more than just Cobol skeleton code to follow?
I don't think we've found anything in Cobol that Pacbase can't do. But I don't think that we've stretched it to its limits. Up until December 1986, we only did one major project with it, and that was an invoice-entry system.

Now what do you use Pacbase for personally?
I manage the data, which we consider a corporate asset. We have VSAM files and the TIS data base from Cincom Systems, Inc., and we are in the process of converting to Cincom's Supra relational data base.

I use the data dictionary primarily because I keep track of all the data and when new projects come in, I do the file design.

Has Pacbase made your job easier?
As far as the dictionary goes, it makes my job much easier because it's automatic. One of Pacbase's best features is maintenance, cross-referencing. For example, whenever you use an element in any kind of program, it is automatically stored as a cross-reference in the dictionary, no matter what.

So you can always track your work?
Right. There are very few ways you can make a mistake.

We are in a transition period at Allied. We were using primarily VSAM and some TIS files, and now we are looking at using TIS and Supra. Potentially, we also have IBM's DB2.

So we need to have a marriage of these different kinds of files. Pacbase makes our transition relatively data-independent. It allows us a long-term, orderly transition in which the programs will be insulated from data-structure changes.

What about documentation?
Pacbase automatically produces technical documentation that is excellent. Also, Pacbase is very ordered and structured, and it forces environmental control. There is no other way you can do your job. You have to do certain things in a certain order, [the programmers] have to come to me to get their data elements, and documentation for validation is on the data element itself — it's not even in the program. So all that gives it an option for better maintenance.

Does Pacbase have any problems?
There are some points that I don't like. Most of them are due to the implementation rather than the concept of the product. Many of the features that CGI developed have strong concepts, but the implementation is often cumbersome and a lot of times it's primitive.

Is it difficult to use?
Yes. I've seen a lot of other software packages on the IBM 3270 and a mainframe, and I really don't think [CGI] has taken advantage of that software/hardware combination. For example, when you are keying in long strings of text, there are four or five fields on the screen, and the actual line of text is the fifth field. You can't touch-type. You must watch the screen and then tab yourself over.

Up until this release, 7.2, there was no renumbering. So if you numbered by 10s and then decided you needed another paragraph, you had to renumber everything by hand. Also, it has a Copy statement but not a Move statement.

Allied's Bennett, *data administrator*

Pacbase has a Copy statement and not a Move statement?
Right. If you want to move something you have to copy it first and then delete it.

Another problem is that the product has only been in the U.S. for two or three years. That means that no matter how much money we are willing to pay, we cannot find anyone with more than three years' experience.

Also, CGI's education is poor. Their manuals are impossible — mostly transliterations from French.

It's not a straightforward product; all the screens are full of cryptic parameters — things that aren't immediately obvious. Once the staff is trained, they're fine. But it's not a three-week process. It's maybe three to six months, depending on the coding.

So those things make it harder for us to use. The on-line system, however, is excellent. The programmers love it.

What is that like?
It's like writing CICS on-line transaction programs. They also have a comparable feature for writing batch programs. The programmers don't like that one at all.

Everyone says the on-line system takes away a lot of the tedious tasks. They really feel, after they get used to it, that writing in Pacbase is better than writing in native CICS code.

But in the batch system, I think resistance is too strong a word. They don't really resist it, but the comments have not been complimentary. But they understand that it is very necessary for Allied Van Lines to have the dictionary complete and to keep its integrity. If they write something in Cobol, it's not in the dictionary, and when it comes time to do maintenance, we won't know about it. That is so important.

For the most part with Pacbase, we feel the whole is greater than the parts.

Is the key benefit of Pacbase that it keeps your dictionary consistent?
I think so. It's active. If something is used in a program, I don't have to track around to the programmers and ask them to give me documentation or to let me know about it. If I put validation in the dictionary, it is there immediately the next time a program is compiled. So those things for the maintenance aspect are very valuable. •

CASE tools

CONTINUED FROM PAGE 76

reality. While some products offer reasonable architectural integration, others force the analyst to enter and exit separate components with little or no continuity.

In addition, true functional integration still exists only as an idea. The CASE products that may someday support the entire systems-development life cycle will be those whose vendors have accepted the incorporation of both architectural and functional integration into the product as a long-term direction.

- The support of a single methodology. For the MIS manager whose organization employs multiple diagraming or design techniques, selecting a single CASE product may prove to be a difficult task. Most of the CASE products available support only one set of diagraming symbols and may or may not provide methodology-unique features such as enterpriser modeling or data structuring and normalization.

This problem has two solutions. One is the purchase of multiple CASE products. But while this may resolve the immediate, short-term problem of supporting multiple methodologies, consider, too, the related problems of integration and standardization.

The second alternative involves the vendor's future direction. The ability to translate diagrams from one methodology to another, as well as the expanded functionality that would encompass the multiple techniques, are much-discussed topics among those interested in the future of CASE products.

A product that will offer some degree of support to the greatest part of the organization and whose future includes the eventual support of multiple methodologies may be the better choice for an MIS manager to make.

- Few alternatives for customization. Very few products offer the MIS manager the capability of incorporating new rules and exceptions to the standard methodologies that would satisfy the needs unique to his organization.

In choosing such a product, you must examine the organization's willingness to completely adapt to the methodology supported by the product.

A PRODUCT whose future includes the eventual support of multiple methodologies may be the best choice for an MIS manager to make.

- Lack of effective interface with data base management systems and fourth-generation languages.

Many MIS managers have recently established long-term directions for their organizations by choosing a data base management system and fourth-generation language. A major issue encountered in selecting a CASE product is its compatibility with the chosen DBMS and fourth-generation language. Although few CASE products actually interface with these, consider how the product will support the process of data base design, how the information will be transferred and whether the prototyping tools of the

Continued on page 83

Life cycle coverage

Asking the following questions of CASE tool venders will help you determine where the available CASE products fit into the development life cycle

☑ **What plases of the life cycle are supported?**
☑ **Is maintenance supported? Re-engineering?**
☑ **Are project management tools included?**
☑ **Are prototyping tools included?**
☑ **Is there an automatic code generation capability?**

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USER INTERVIEW

Breaking bottlenecks

A year and a half ago, Dallas-based development and data administration professionals at Arco Oil and Gas Co. tested and purchased Excelerator, a CASE tool from Index Technology Corp. Troy Worthy, supervisor of data administration, uses the product to speed data-modeling procedures.

ALAN WITSCHONKE

Arco's Worthy, *supervisor of data administration.*

Worthy recently spoke with *Computerworld* Senior Editor Janet Fiderio.

As a data manager, how did you come to use Excelerator?
We got involved with Excelerator when we were looking for a tool to automate our data-modeling process. Most of the mainframe tools were expensive and weren't really full-functioning. Then we came across the Excelerator product, which our development people had been looking at as well.

Did you go with Excelerator solely because it gave you an automated data-modeling tool?
Initially, yes. But shortly after we made the decision, Arco started restructuring the whole business, which meant I had to come up with ways to leverage the people I had, since our staff had shrunk considerably. We did an internal analysis of our own profits and examined how we went about the data management process and found areas where we needed to make changes.

At the same time, we realized that if the project teams were going to be working with Excelerator as a part of their methodology, then we might be able to piggyback on that use and leverage Excelerator to do some of our work for us.

That's when I modified a few screens from the Excelerator dictionary. Most of our internal development is done in Cobol, and Excelerator's data-capture screens don't necessarily capture all the information we need for our mainframe data dictionary.

Tell me about the modifications.
I modified several screens and wrote software that takes the output from the Excelerator export function and creates transactions that feed into the IBM data dictionary. It's a two-way bridge.

I also wrote software that takes information coming from the IBM data dictionary and puts it in a format that you import into Excelerator.

Those bridges were not included in Excelerator when you bought the product?
No. They give you the import/export capabilities. They will export a file and then tell you what it will look like, and they'll tell you what the files are if you want to import something into Excelerator and also what it will look like.

But the mainframe interfaces did not, and do not, come with the product.

Is that a shortcoming of Excelerator?
It's not much anymore; they adopted the one I wrote. It's being distributed by the Excelerator users group now. Independent of that effort, [Index Technology] did go in and develop a mainframe interface for the data manager.

Do you use the data manager now?
No, we don't use the data manager. The feedback we got back from [Index Technology] at the user conference was that they polled their user base and found that the user base had more data manager people than IBM people, so that was their first area of concentration.

How has Excelerator changed the way you do your work?
From the data administration perspective, it means far fewer forms that the project developers have to fill out. Our earlier efforts, to be absolutely honest, were very forms-intensive. We were pretty much viewed as being a bottleneck in the organization.

So [Excelerator] has eliminated the filling out of forms. Project developers still have that option, however, if they choose to use it.

What about productivity increases? Have your bottlenecks dissolved?
The tool has improved our productivity. I can't give you exact figures, because right after the interfaces that I mentioned earlier were developed, development activity slowed because of the restructuring.

We did, however, work with the developers during a major production redevelopment activity. Part of the process we go through is to develop logical views of the data.

On that specific project, when developing the logical views, the developers got almost a 10-to-1 productivity increase. That meant they developed their logical views 10 times faster than they would have previously.

The application was a big one, and it had a lot of data stores involved with it. When we showed [the developers] how to do it with Excelerator, it really increased their throughput.

What about new releases?
We got the new release of Excelerator — Release 1.7 — shortly after the first of the year.

Since then, I've developed more software to work with it so we can transfer IMS segment definitions between the mainframe and Excelerator.

What are you running Excelerator on?
Here it runs on a combination of Wyse Technology PC286s, personal computers that I built and some IBM Personal Computer XT equipment.

Was it difficult to learn to use Excelerator?
No, it's not difficult from my perspective, but it does have its shortcomings.

Like what?
It doesn't support Cobol to the level I would like. We still do the majority of our mainframe applications in Cobol. Particularly on the element definition side it's weak.

What development methodology do you use, and does Excelerator support it?
The SDM structure development methodology. It's basically Yourdon data-flow diagrams and models. And no, we don't have any problems with methodology support.

Are you satisfied with the product?
Yes, I'm definitely pleased. We were doing data modeling by hand. After you redo models multiple times, you finally get to the point where the hassle of changing them will make you stop before you should. Excelerator eliminates a lot of that. •

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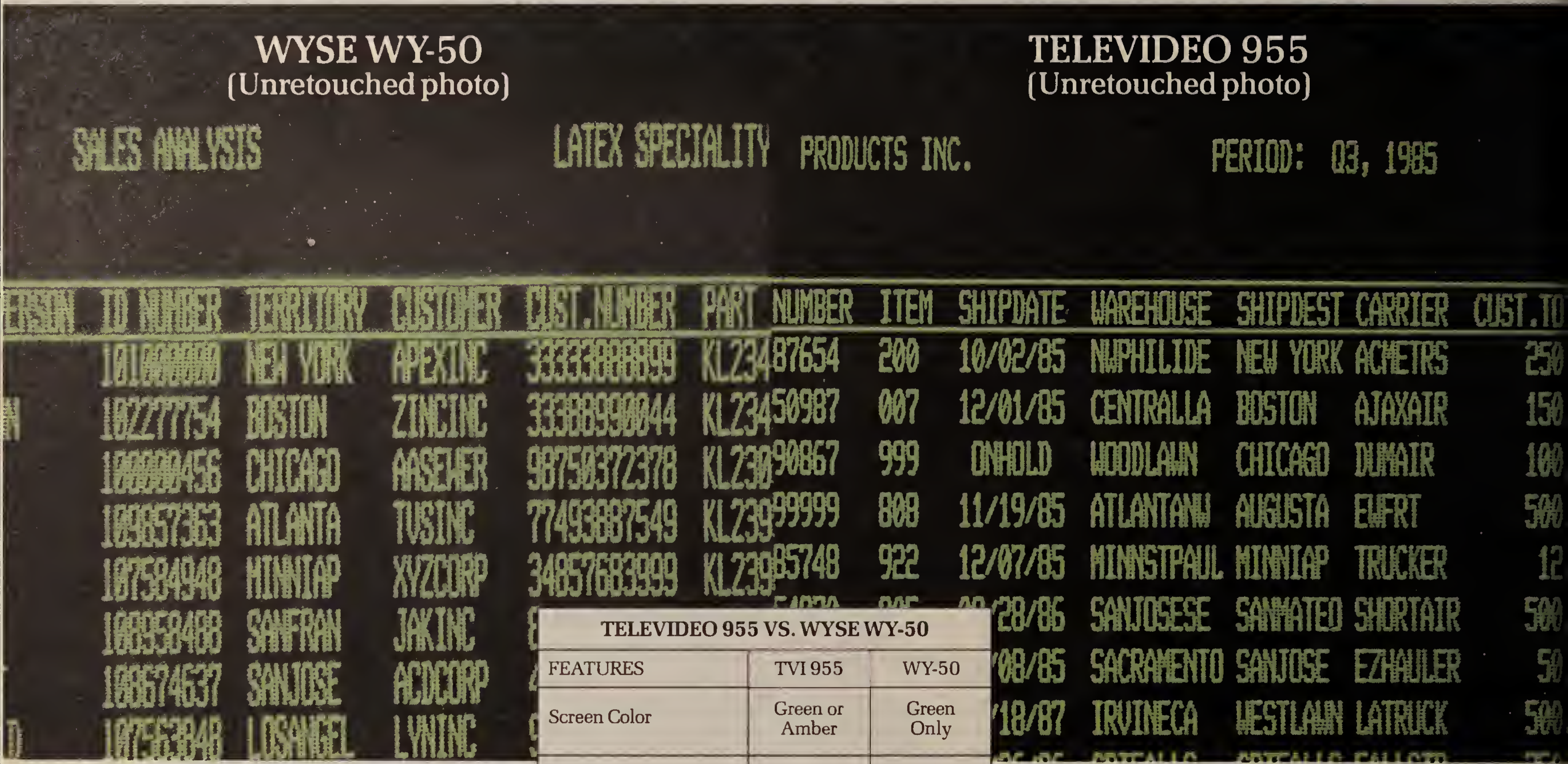

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In brief: Tool selection

Know your MIS needs, the vendors and the product market

Selecting the right computer-aided software engineering (CASE) tool is a difficult task. A crowded market, products that constantly change, hard-to-define MIS needs and CASE tools that must be selected, in large part, based on their future direction are a few of the snags you will encounter in the acquisition process. The following critical steps, however, can help you make a solid product choice.

- **Clarify your objectives.** Whether your objectives are as simple as acquiring a tool to automate the drawing of diagrams or as complex as establishing a standard structured development methodology throughout the organization, to select the right product, you need clearly defined objectives.
- **Organize your efforts.** Create a selection team composed primarily of MIS professionals involved in the design and development of current systems. In addition, carefully selected user representatives may provide valuable insight into components of the CASE product such as documentation, prototyping tools and diagrams by evaluating their effectiveness as communications tools. One of the first tasks of your selection team should be to review and discuss the project objectives.
- **Research the products.** If you and your selection team are not familiar with current tools, gather as much information from as many CASE vendors as possible and review the literature. This will give you a picture of the functions and capabilities available in CASE products today.
- **Define your requirements.** Once your team understands what is available, define your organization's requirements for a CASE product.

These requirements may include the support of a particular methodology or the ability to interface with a data base management system. The complete list of requirements should then be documented and prioritized in a checklist. These requirements will form the basis against which candidate CASE products will be measured.

- **Evaluate the products.** Next, compare each candidate CASE product with the requirements checklist. Products that fail to meet the most critical requirements should be eliminated. Of those that remain, the two or three highest rated products should be explored in greater detail. Your selection team should request a demonstration of each product, and it should evaluate the performance and ease-of-use of each product in a hands-on session. Contact other organizations that use each CASE product and document their responses to a set of strategic questions about the effectiveness of the product and the support of the vendor.
- **Evaluate the vendors.** Since many of the potential benefits of CASE products will result from a vendor's future direction, your selection team should choose a vendor as carefully as it does a product. It is important to research the market position of the vendor by examining how long the CASE product has been on the market and the amount of products that have been sold.

The number of individuals dedicated to supporting and enhancing the product can also indicate the vendor's commitment to the product's future.

- **Examine the costs.** The selection team should also consider the total cost of each top CASE product.

This process involves examining more than the price alone. The costs for hardware, maintenance, training and time lost during implementation are examples of the related costs of a product that should be estimated and documented.

These costs will provide information crucial to determining which system offers the greatest benefits at the most effective price.

- **Consider the issues.** Before purchase, your selection team must consider implementation issues, ranging from training and installation to how the product could be integrated into the organization's current systems process. By examining these implementation issues before a product is purchased, the team can make a more accurate assessment of each product's impact and can incorporate this impact into the final evaluation.
- **Make your selection.** Your team's final selection should represent the assimilation, review and evaluation of all the information gathered in these steps. Now you can be confident that by following a structured approach, your team has chosen the CASE product that represents the best use of your organization's resources. •

JIM HULING

CASE product evolution

By the 1990s, reusability and intelligent methodology drivers will be key CASE tool features.

Early 1980s	Mid-1980s	Late 1980s	Early 1990s
Computer-aided documentation tools	Automatic design analysis and checking	Automatic code generation from design specifications	Intelligent methodology driver
Computer-aided diagramming tools	Automated system information repository	Linking design automation and program automation	Habitable user interface
Analysis and design tools		Linking graphics interfaces	Reusability development methodology

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Four in the front: The PC market leaders

The computer-aided software engineering (CASE) market is chock-full of vendors offering everything from tool kits to consulting services. The following are the four vendors that lead the market in terms of the number of copies of commercial personal computer-based CASE products sold:

- **Index Technology Corp.** calls its CASE product Excelerator, which is an analyst/designer tool kit introduced in August 1984. Retailing for $8,400, Excelerator runs on the IBM Personal Computer AT, PC XT and 3270 Personal Computer; Compaq Computer Corp.'s Compaq Plus, Deskpro 386, Deskpro 286 and Portable III; AT&T's PC 6300; Wang Laboratories, Inc.'s Professional Computer; and Texas Instruments, Inc.'s Professional Computer. Index Technology, based in Cambridge, Mass., has sold 5,500 copies of Excelerator.
- **Nastec Corp.** introduced its Case 2000 Designaid workbench for the PC in 1985. Currently priced at $6,900, it runs on the IBM PC XT, PC AT, 3270-PC and compatibles. Nastec has sold 2,500 copies of Designaid to date. The company's headquarters is in Southfield, Mich.
- **Knowledgeware, Inc.**, an Atlanta-based company, has sold 1,200 copies of its Information Engineering Workbench. It runs on PC ATs or 100% compatibles and retails for $7,500. Knowledgeware introduced the Information Engineering Workbench in November 1985.
- **Cadre Technologies, Inc.** in Providence, R. I., introduced its Teamwork analyst/designer tool kit in June 1985. The most recent information available indicates that the company has sold 200 copies of the product. Teamwork runs on workstations from Sun Microsystems, Inc., Apollo Computer, Inc. and IBM as well as Digital Equipment Corp.'s VAX. The product retails for $8,900 for the workstation version. In January, Cadre bought a PC-based workbench, PCSA, from Structsoft, Inc., which introduced the CASE product in January 1986. There are 750 copies of PCSA installed to date. It costs $995 and runs on IBM PCs and compatibles.

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CASE tools

FROM PAGE 78

CASE product can be used in conjunction with a fourth-generation language.

- Applicability to existing systems. If CASE products are to effectively support an organization's systems-development life cycle, they must address the significant considerations in maintaining the organization's existing systems as well as those associated with systems development.

Much of the focus in CASE products is on systems development. However, there are significant challenges for CASE products as they apply to existing systems. One challenge is the maintenance of systems that have been developed through the CASE product. For example, consider whether you want to maintain the actual program source code generated by the CASE product or simply maintain the specifications and regenerate the programs.

Another consideration in applying CASE products to existing systems is the feasibility of maintaining older systems. Entering the specifications required to regenerate a complete system in order to perform a modification may not be sufficient to outweigh the amount of effort involved. However, by systematically defining and generating modules of the older system through the CASE product, it may be possible to replace the system gradually while minimizing the effort for each modification made.

> YOU must evaluate organizational considerations before making a decision on CASE. Not every company is ready yet to use a CASE product.

Making the CASE decision

You must evaluate significant organizational considerations to make an effective decision on implementing CASE. Not every company is ready yet to acquire and use a CASE product.

Asking the following questions will help you evaluate your readiness to accept and benefit from a CASE product.

- **Is your organization prepared for structured analysis, design and development?** Since the introduction of structured systems-development methodology in the 1970s many analysts have adopted its principles. However, an equal or possibly greater number have not. Many analysts will follow a methodology only to the point at which they can visualize the new system in terms of program code. Beyond that, they view further analysis as simply another obstacle to the coding's completion.

When considering the acquisition of a CASE product, first evaluate your organization's willingness to accept the methods that the product supports. This may involve the acceptance of a structured methodology, training in its techniques and enforcement of its use. While a CASE product may be acquired to support this process, its acquisition alone will not guarantee ultimate success. MIS must make a firm commitment to structured systems development for the methodology, and the CASE product, to succeed.

- **Is your organization prepared to support the specific hardware requirements of a CASE product?** Many of the CASE products available today operate only in specialized hardware environments, which may not be compatible with your mainframe or minicomputer. Even those products that operate on personal computers may require local-area networks to support medium- to large-scale projects. Evaluate the feasibility and appropriateness of supporting these requirements.
- **Is your organization prepared to integrate a CASE product into its entire systems-development life cycle?** While computer-aided software engineering products offer significant benefits even when

Continued on page 86

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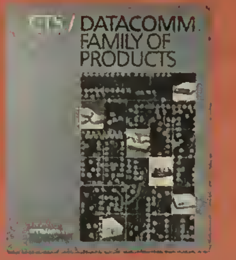

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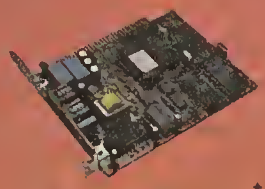
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What do you ex

If you think Symbolics workstations understand only one language, talk to only one kind of computer, and start at a very high price, here's food for thought: Symbolics systems start at $36,000. And $36,000 allows you to choose from an extensive menu of industry standard protocols, languages, and services, all designed to make ours the most easily integrated AI and advanced software development system available.

Support of standard languages/protocols

Symbolics supports Ethernet, TCP/IP, DECnet,™ and SNA standards. One keystroke is all it takes to integrate our workstations into your current environment, be it IBM,® DEC,™ UNIX,™ or just about any other. But we don't just support existing standards. We lead in the development of new ones. We were the first to implement the Common Lisp standard, and we're actively working on the development of the standard for object oriented programming.

And Symbolics supports a range of standard languages. You'll receive the benefits of our software environment whether you program in Common Lisp, Prolog, Fortran-77, Pascal, or Ada.® There's no need to learn a new programming language.

Finally, current software can be upgraded with AI functionality on a Symbolics workstation. Instead of making your previous investments obsolete, Symbolics will make them more valuable.

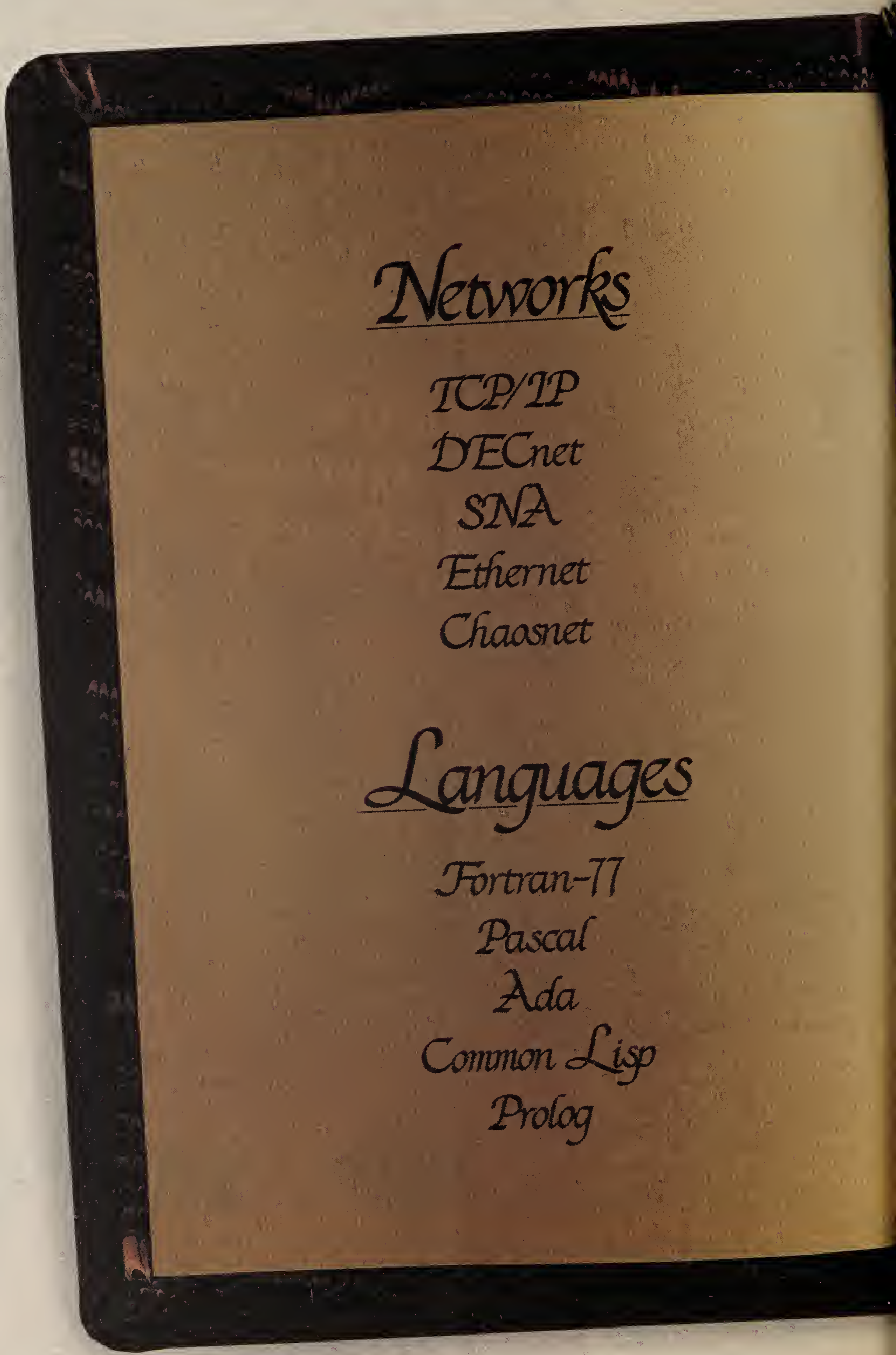
Transparent networking

Symbolics is the only workstation with a Generic Networking System. This allows you to network *transparently* to UNIX, Digital, and IBM, with one simple command—the workstation initiates all necessary protocols, automatically.

The Generic Networking System also allows for other services that make networking easier, and programming faster: Remote Log-in, Transparent File Transfer, and Electronic Mail.

Remote Log-in allows users to log into any host on the network, or many hosts simultaneously, with one keystroke. Transparent File Transfer lets users access files, even those located on multiple, non-Symbolics computers, with the same command. Electronic Mail lets users send electronic mail to, and receive electronic mail from, other users on remote hosts. It also has full editing capability.

All this is why 90% of the 3,000 Symbolics systems delivered to date are used in heterogeneous environments.



Networks

TCP/IP
DECnet
SNA
Ethernet
Chaosnet

Languages

Fortran-77
Pascal
Ada
Common Lisp
Prolog

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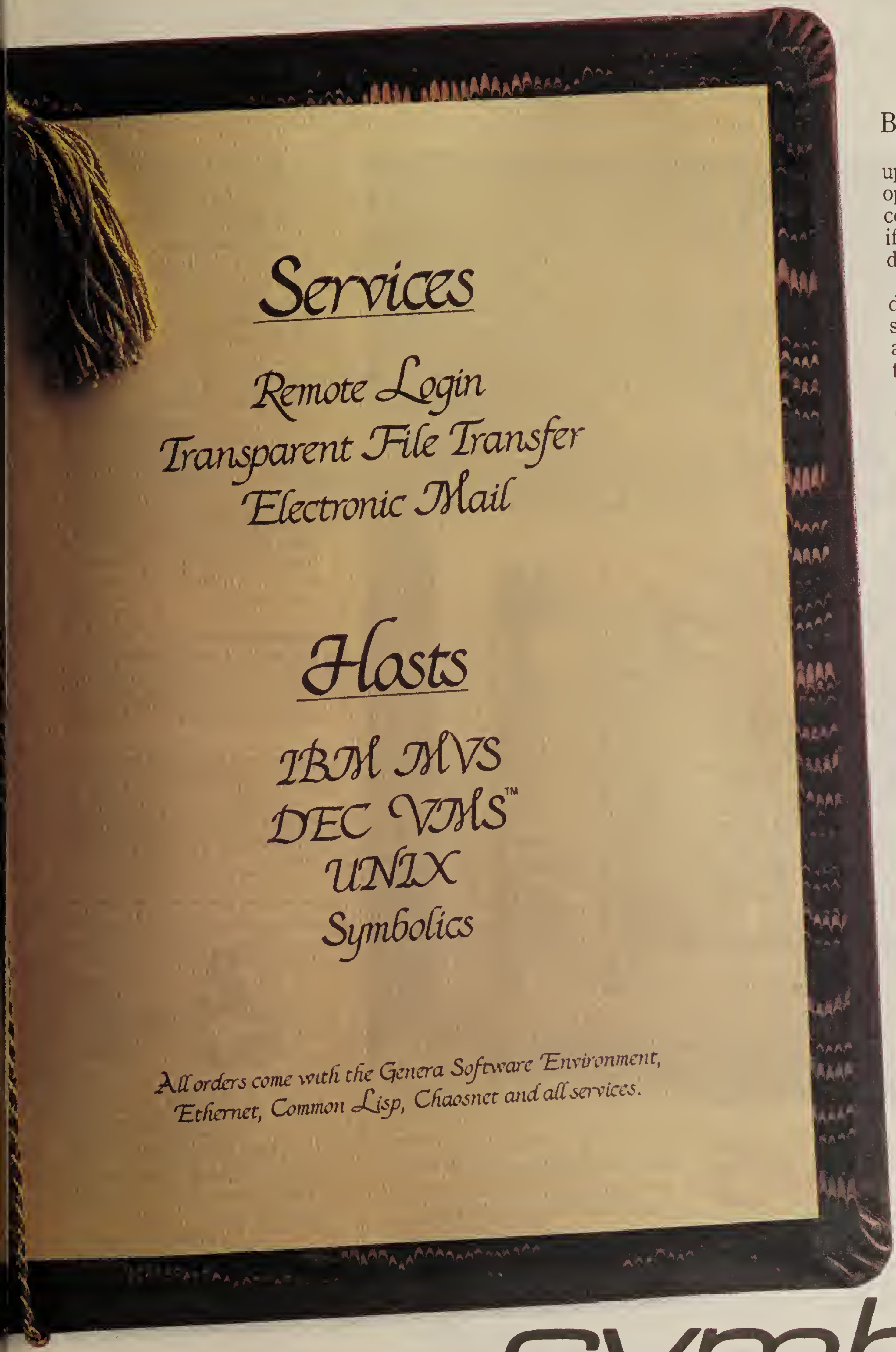

Services

Remote Login
Transparent File Transfer
Electronic Mail

Hosts

IBM MVS
DEC VMS™
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Symbolics

All orders come with the Genera Software Environment, Ethernet, Common Lisp, Chaosnet and all services.

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Symbolics systems allow programs or program updates to be distributed to all software developers as they're written. The work of individual contributors can be continuously integrated, even if they're working in different languages on different systems.

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- 40 times as many pre-coded Lisp functions as systems that offer just a Common Lisp compiler.
- Automatic run-time data-type checking with no performance penalty
- Advanced run-time debugging
- Fastest edit-compile-debug loop
- Rapid prototyping
- Faster, smarter garbage collection

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CASE tools

FROM PAGE 83

they are acquired to support an individual component of the development life cycle, such as diagraming, their greatest benefits are obtained when the products are completely integrated into the organization's systems-development process.

> WHILE a CASE product may be acquired to support a certain process, its acquisition alone will not guarantee success. MIS must make a firm commitment to structured systems development for the methodology, and the CASE product, to succeed.

This may require substantial changes in the way in which systems are designed, developed and implemented. For example, automating the drawing of analysis diagrams and the definition of their information in a data dictionary will certainly make this part of the process easier. However, if this information can be easily translated into a working prototype that users of the system can review and modify, then the CASE product's benefits will increase dramatically. The organization is then required, however, to dedicate time and resources for effective prototyping. If prototyping is not currently a part of your development process, you must assess the feasibility of incorporating it.

- **Is your organization prepared to implement a CASE product?** The implementation issues associated with each CASE product may vary considerably from organization to organization. For example, you may want to consider whether to implement the CASE product through a series of pilot projects or simultaneously throughout the organization.

Another implementation consideration is training. The MIS manager should weigh the economies of scale and the faster transition times associated with training all the analysts at once against reduced disruption and acclimation time — the characteristics associated with a gradual training process.

Although CASE systems' potential exceeds the functional capabilities available today, the products can still offer significant benefits. If you combine a thorough understanding of the products with a careful examination of the technical and organizational issues involved, an investment in CASE may indeed mark a first step toward a new era in software engineering. •

For further CASE study

If you need more information on computer-aided software engineering, these books and seminars may prove helpful.

BOOKS

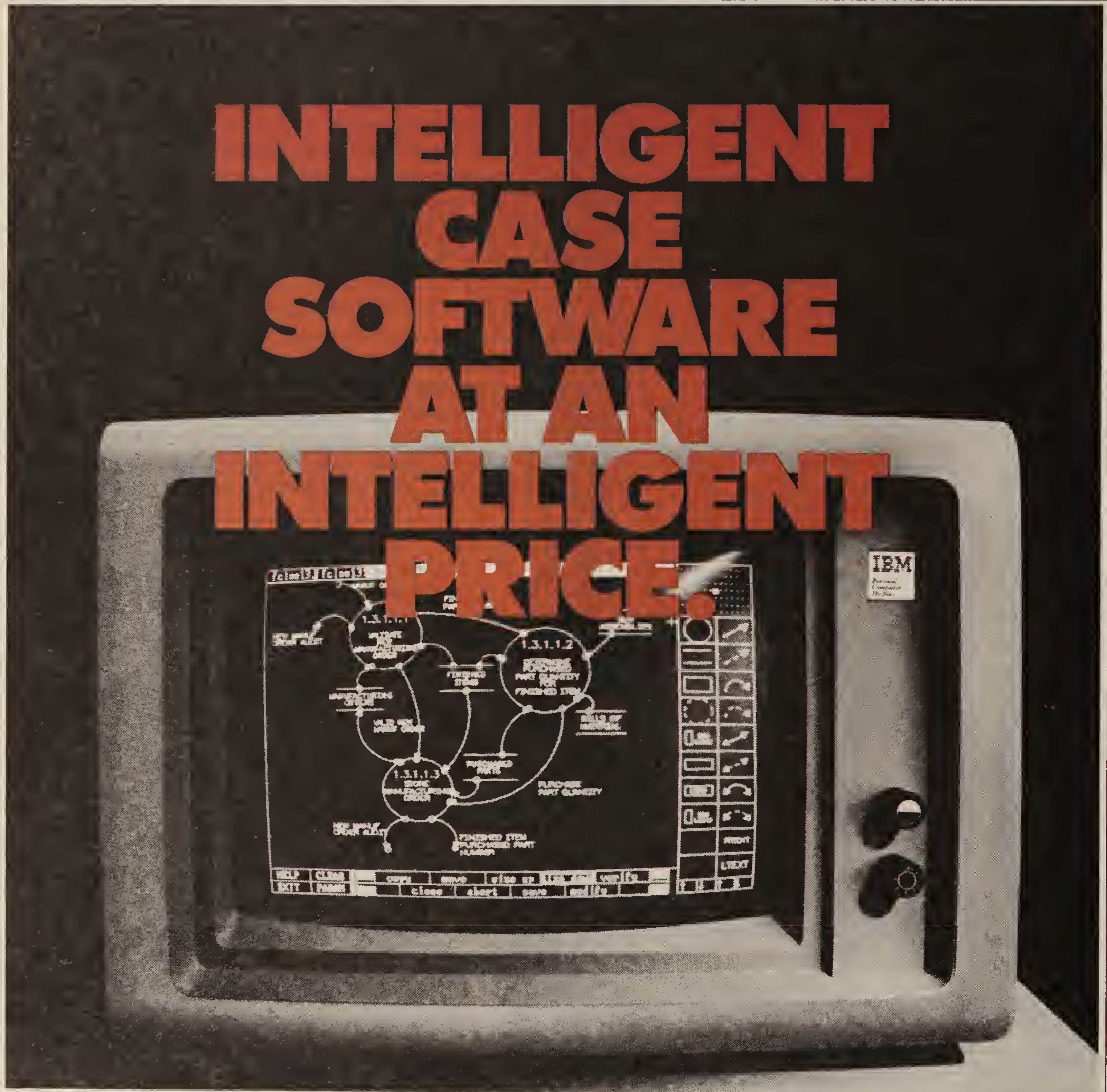
The James Martin Productivity Series on Computer-Aided Software Engineering. Contact: Pieter Mimno, Publisher, 36 Bessom St., Marblehead, Mass. 01945.

Computer-Aided Software Engineering Symposium Proceedings. Contact: Digital Consulting, Inc., Six Windsor St., Andover, Mass. 01810.

SEMINARS

CASE '87. May 27-29, Cambridge, Mass. Contact: Index Technology Corp., One Main St., Cambridge, Mass. 02142.

Computer-Aided Software Engineering Symposia. June 22-24, Washington, D.C.; Sept. 21-23, Boston; Oct. 27-29, San Francisco. Contact: Digital Consulting (see above).



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Error and consistency checking, an integrated data dictionary, and one of the easiest to use menu systems make for a professional system that offers everything you could want in a CASE system—at a remarkably low price. And lest we forget: the Toolkit includes technical support from the people who know Structured Analysis and Design better than anyone. And we ought to. After all, we wrote the book on it. Now we've written the software.

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THE CASE OF THE RAGING CFO.

What were behind his impossible demands?

Recently, you may have read about "The analyst who knew too much" and the problems he caused his company.

We can still send you a copy of that case story if you missed it. (Just use the coupon). But today, we'd like to share with you the story of another Fortune 500 company and the headaches that the CFO there caused for MIS executives.

It is a story well worth reading. It will help you answer questions your CFO will probably ask you. It could save your company money.

And, if you are like the MIS executive in this story, you may turn out to be a hero.

You will also learn about a new advanced financial software product called FASTAR, which was developed by Corporate Class Software, a subsidiary founded by the $3 billion Celanese Corporation.

Here's what happened.

The new CFO of a $2 billion-plus consumer products company had a reputation for toughness that the MIS director soon learned was well deserved.

Within weeks after taking command, the CFO made his demands known. He wanted five years of data available for each division and each product line–up from three years. He wanted faster reports and faster analysis from his staff. And he wanted MIS to arrange for all of this "as soon as possible."

There was only one problem. And the MIS executive knew it. What the CFO wanted was simply impossible to do well without a fourth generation language solution. And the MIS executive had enough experience to know what a fourth generation language solution would mean.

TROUBLE, TROUBLE, TROUBLE.

There would be hours and hours of expensive programming and maintenance to support a 4GL solution. And financial analysts still would not be able to work readily with their PC-based spreadsheets.

To complicate matters further, different parts of the existing system kept the same financial data in different formats. The cost of maintaining redundant data that could not be easily shared by analysts was running higher and higher.

A team of MIS executives and financial support personnel soon came to a grim conclusion: Several months would be needed to meet the CFO's demands. And the maintenance problem would grow and grow.

What would you have done in their position? As one observer put it: "They knew they had a major problem on their hands."

A DRAMATIC DISCOVERY.

The solution came from a company called Corporate Class Software.

"The executives at MIS didn't believe us at first," recalls one Corporate Class executive. "And I can't blame them. What we had produced didn't seem likely."

The company had developed a product called FASTAR–Financial Application Solution to Analysis and Reporting–that was the first *packaged* solution to *advanced* financial applications.

No fourth generation languages were needed to perform financial applications. No macros were necessary. And all data could be loaded onto Lotus 1-2-3 spreadsheets for work there. (Yes, we'd be skeptical too. You'll find out how all this was done in a minute.)

When the decision was made to test FASTAR, the entire system was set up within a week and loaded with a division's worth of data. Now, when an analyst compared the cost of a product over five years, it took only minutes, instead of an entire day.

What's more, the CFO now had the flexibility to assign new divisions and product lines to his analysts without taking the time to reprogram the system. FASTAR was built to expand horizontally (for companies) and vertically (for products).

How could all this be done?

THE PRODUCT THAT ALMOST DEFIES DESCRIPTION.

FASTAR acts as a bridge between PCs and mainframe financial production systems, such as the general ledger.

But it is more than a bridge. It is a ready-made solution for advanced financial applications that organizes data the same way that analysts are used to working with it–by financial schedule (income statements, etc.), by organization entity (divisions, etc.), by period (day, week, month, etc.) and by type (any fourth type of data you choose such as actual, budget or forecast).

With the proper clearances, analysts can access financial information from any financial schedule for any company in the corporate structure. And they can consolidate and analyze that information without ad hoc programming. (Our powerful analysis package is built in, so there's no fourth generation language or macros programming needed. Even analysts who are computer illiterate can derive the same benefits from FASTAR as anyone else.)

	INTERNALLY DEVELOPED	PACKAGED SOLUTION
BASIC APPLICATIONS	COBOL	MSA McCORMACK & DODGE SOFTWARE INTERNATIONAL
ADVANCED APPLICATIONS	4 GLs SPREADSHEET LOTUS MACROS	**FASTAR**

FASTAR is not a tool, but a ready-made solution for advanced financial applications, including financial consolidation and management reporting.

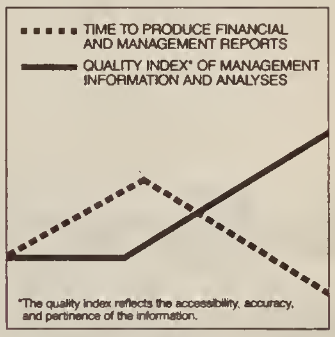
As a result, analysts report more quickly, consolidate more accurately, and analyze more frequently.

One company found, for example, that year-end reports that used to be available in early April, just prior to the annual meeting with shareholders, were now ready in February. And consolidations that used to take two to three days now took hours–with more accurate content. (One way that we've made consolidations more accurate is through a rigorous system of data checks that automatically check data integrity.)

BRING THE NUMBERS BACK WHERE THEY BELONG.

FASTAR also addresses the critical issue of data integrity and control.

Because FASTAR takes all programming off the spreadsheet, there are no undocumented programs to cause costly mistakes. (One analyst in another company had written a 1,000 line macros program before management pulled the plug. He was the analyst who knew too much.)



FASTAR is the packaged solution to advanced financial applications that can provide quantitative and qualitative improvements in your company's financial analyses.

FASTAR also eliminates the need for passing data back and forth on pieces of paper and having secretaries or analysts type them into spreadsheets. This reduces the number of potentially dangerous errors that can occur.

And, perhaps most importantly, because all financial information is stored in FASTAR's data base, MIS executives regain control of critical data.

You also protect your company's investment. FASTAR accepts data from fourth generation language products and database management systems, as well as microcomputer applications. (None of the companies using FASTAR needed more than three days to adapt the program to their corporate needs.)

In the final analysis, MIS executives show themselves to be strategic thinkers by giving analysts a tool to be more productive. (Did you know that one company found 85 percent of an analyst's time is spent just looking for data?)

You can see why financial professionals are interested in FASTAR. And why the chief financial officer of a $3 billion company would put his reputation on the line to become chairman of our board of directors.

But we think you have a lot of questions about FASTAR, too.

We'd like to answer them for you. Just call 212-719-8209 and ask for our free brochure.

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To: Mr. Richard J. Lyons,
President and Chief Executive Officer
CORPORATE CLASS SOFTWARE, INC.
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23rd floor, New York, NY 10036

☐ Please send me your FASTAR brochure.
☐ Please call me for a demonstration.
☐ Please send me PC World's review of FASTAR
☐ Please send me a copy of "The Analyst Who Knew Too Much." ad.

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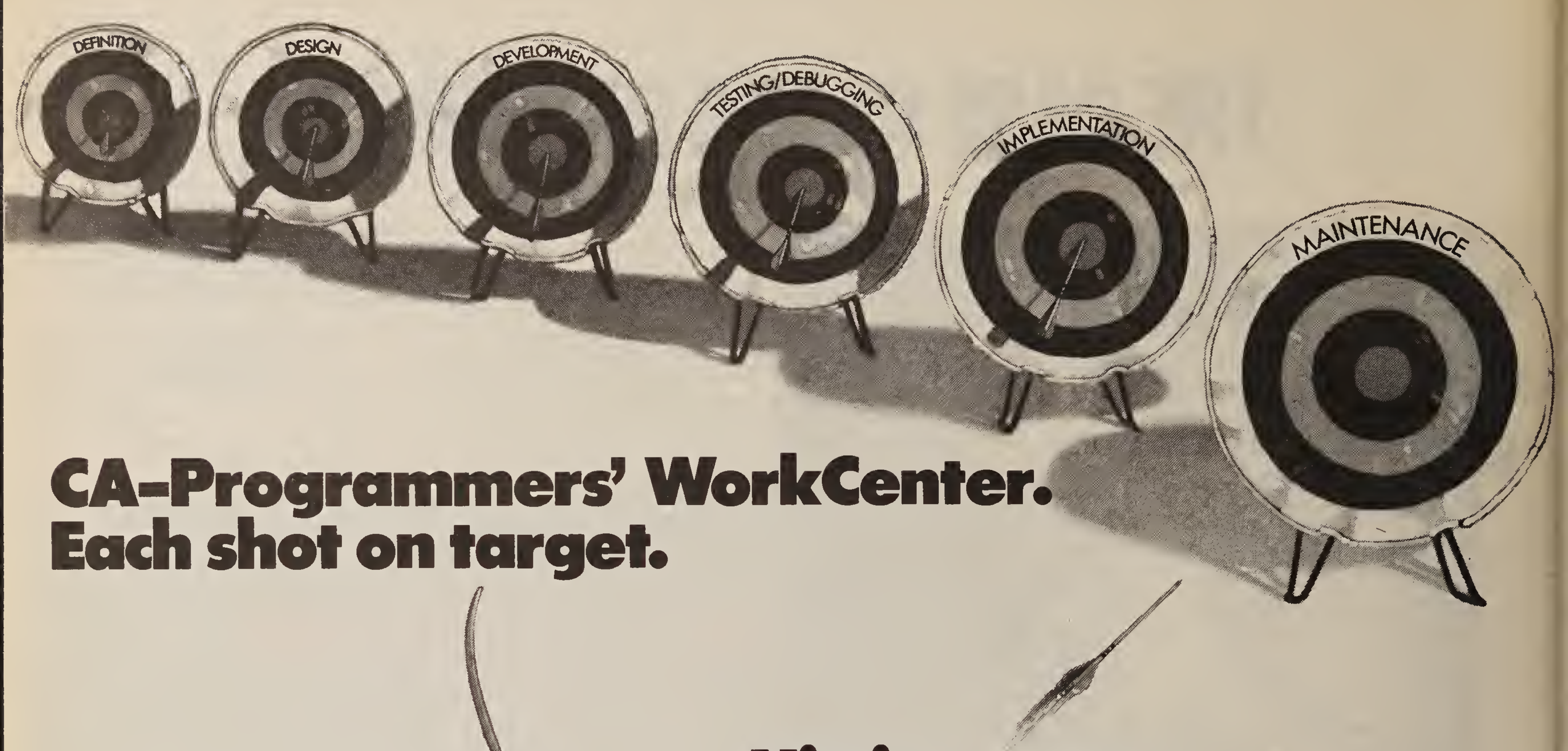

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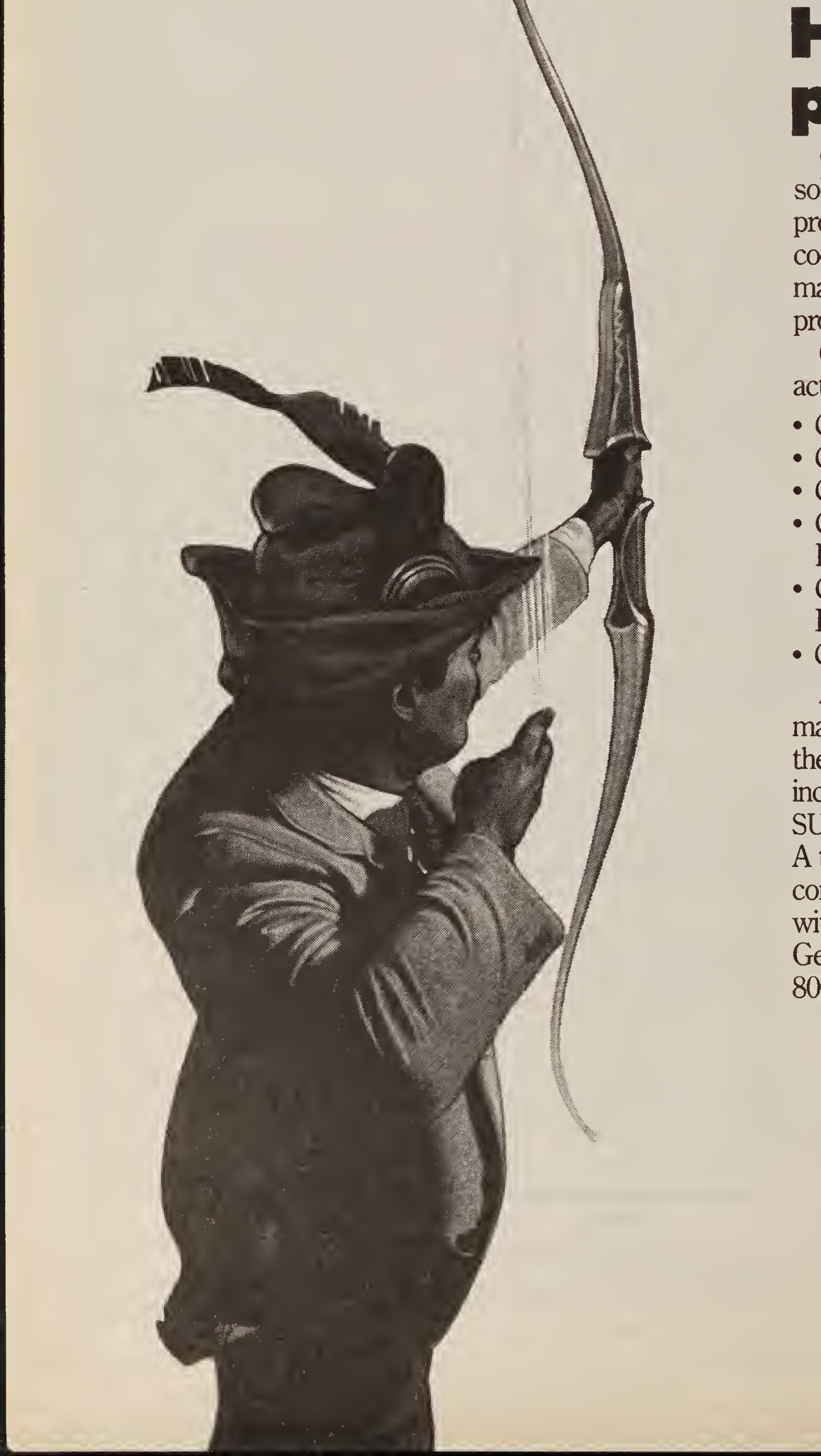

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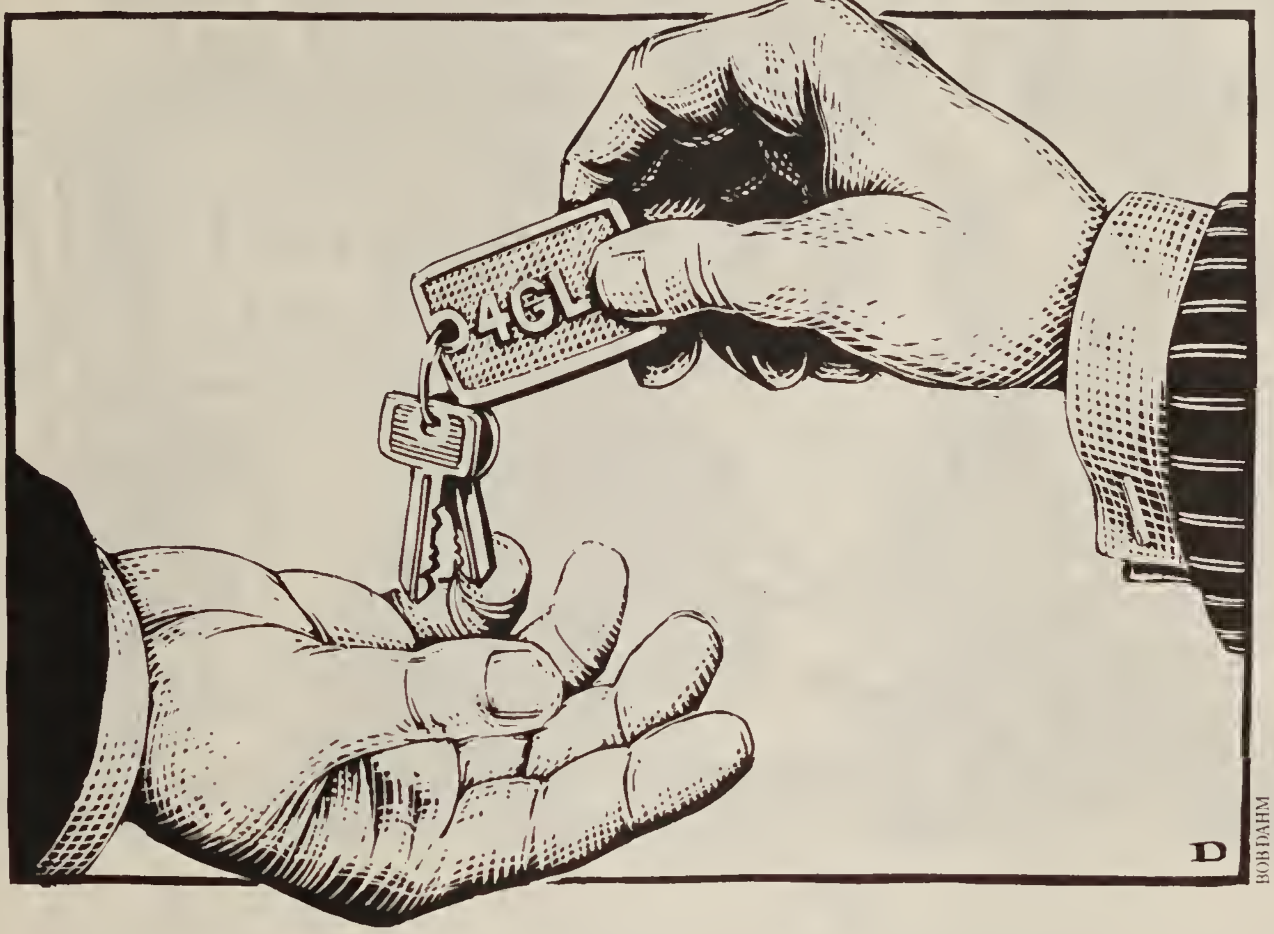
MIS gets behind the wheel

Tired of others having all the fun? Take your new development tool through its paces and show you still know how to use a keyboard

BY DANIEL NOLAN



BOB DAHM

Every DP manager faces the dilemma of wanting to maintain technical skills and still meet the demands of the position that those skills earned. As their older skills are made obsolete by advances in computer science, managers will increasingly feel they are at the mercy of other, newer skills.

Most DP managers earned their positions through hard work and technical prowess. Each promotion leaves them inundated with more administrative details and marketing activities; before long, they begin to feel technically out of date.

When mid-management crisis sets in, managers are tempted either to snap up every new product that comes along and promises to make their system state of the art or maintain its status quo. The former behavior will soon label them as gadget freaks, fair game for every huckster in the business. The latter will earn them lifetime membership in the Anti-Destination League, right along with those self-righteous drivers who lead parades down the left lanes of turnpikes at 55 mph.

Fortunately, if you are a manager, the increased emphasis on user friendliness can be turned to your advantage if you can get some time for a busman's holiday. Buying a new development tool presents you with a perfect opportunity to build up your confidence and see if you still have what it takes technically — or to learn more about your limitations.

As a manager, you can delegate more responsibility to members of your staff. If you do, nothing can stop you from clearing off your desk, rolling up your shirt sleeves and digging into a tightly focused, well-defined project like you did in the days before you were promoted to an oak desk and an overflowing "In" basket.

A job you could love

If you decide to jump into this project, be forewarned that you may benefit from it more than you expected. You will better appreciate the work your staff is doing. You will gain confidence in the tools on which you rely. Just remember that in a week or two, you have to get back behind your manager's desk. So don't have too good a time.

Be prepared to demonstrate that the real benefit of gaining first-hand experience with a product that will affect your organization will be to reduce the risk of relying on outside reports. Furthermore, reviewing the product yourself may even require less effort than you would spend supervising and reviewing the work done by your in-house staff.

Be prepared, too, for the vendor's reaction. When you take the salesmen up on their assurances that their products allow the most junior person to become productive immediately, be gentle. Salesmen generally lack confidence in all computers and may become anxious at the suggestion that the person making the decision has set aside some time for first-hand experience.

Although the overall objective is to select the best package for your firm, you must set a realistic goal. The goal is to accomplish as much as possible in whatever amount of time you can manage to be away from your daily duties.

Suited to the purpose

You will find that a decision to do the evaluation yourself is ideally suited to the purpose at hand. You will be inclined to see flaws in the language as obstacles and shortcomings rather than as opportunities to increase revenue or job security.

In other words, don't feel guilty if you find yourself having fun. Recognize at the outset of the project that this approach has merit in its own right, even though it may not produce a completed system.

In fact, most of the tasks you begin will necessarily be left undone, and the brief time limit that you impose on yourself may result in an incomplete picture of

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Nolan is an Annandale, Va.-based computer scientist specializing in DBMS and fourth-generation languages.

……

- **Avoid mid-management crisis**
- **A schema is a table is a file**
- **Some old tricks work with the new language**

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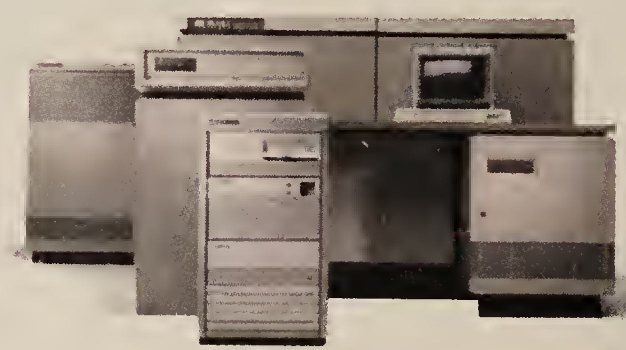

HP 3000 family: Micro 3000 XE, Series 52, 58, 70, 930 and, not shown, Micro 3000 and Series 950.

These systems will meet your needs both now and in the future, without costly reinvestment in hardware, software and user training. They're fully compatible. And they give you a dramatic range of performance—both within the models and between them.

Start with any of the seven models: for instance, the just-introduced Micro 3000 XE. It lets you grow from 4 to 56 workstations and still maintain high performance. That's because it uses HP's advanced NMOS III VLSI technology. And, unlike most other micros, it has the same functionality as the rest of the family.

computers grow with you?

From there, you can expand effortlessly up to the top-of-the-line 900 series, which is based on next-generation HP Precision Architecture to provide mainframe-level performance. And HP can network these systems so you can grow to support thousands of users.

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If you'd like to learn more about how easily you and they can grow together, you can begin by calling 1 800 367-4772, Dept. 282W.

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the problem. This is not a concern.

As soon as you get back behind your desk, you can fill in the gaps and direct others in completing the picture. At minimum, you want to be able to determine what kind of adjustments your organization will need and the ways a new fourth-generation language will affect your staff's work load.

One final point that you should bear in mind: This entire exercise, including any preliminary work and final reports that need to be done, should be finished within two weeks. You, the person conducting the exercise, are not on a sabbatical from your other responsibilities, and taking any longer will get you fired or divorced. Worse, you may awaken some primal urges and find yourself, unwillingly or by choice, programming for a living.

EVEN THOUGH you have told everyone this is just an exercise, don't forget for a minute that employees at your firm will be watching you with great interest. Be professional. Take time to chart a course.

Assuming, for example, that the product you decide to take on is a new data base management system language, your first lesson in writing application programs in this language will be what to call it. Since no standard for these languages exists, they are known by a variety of names, depending on the whims and winds of the marketplace.

Whatever they are called, these languages all possess one common element: Because they are relatively new, few guidelines exist for using the languages effectively to create application programs. While some instruction is available, it is universally conducted by professionals whose major strength in the field is training or systems software and who consequently lack experience in application development.

Those in charge of data processing are thus placed in the uncomfortable position of following recommendations that do not guarantee success or first-hand experience in a short time. Assuming you believe the sales literature that extolls the virtues of this modern technology, you could do one of the following:

- Install the package and wait for the rising stars in your organization to stop Coboling and start 4GLing.
- Bring in a professional trainer, with the proviso that payment depends on your staff's being properly instructed.
- Lead by plowing the first row before turning the reins over to your staff.

This last strategy particularly appeals to those managers fortunate enough to be able to cut themselves some slack time and who remember enough programming to do a credible job. Taking the time to build a complete DBMS application using the older versions of Cobol or assembler and CICS would be impractical.

However, the hype for fourth-generation languages maintains that the bare minimum of time and skills is required, making the experiment practical. You may risk taking a pratfall, but good leaders need to be able to laugh at themselves at least once in their careers.

Step 1: Do not start programming immediately. Even though you have told everyone this project is just an exercise, don't forget for a minute that employees at your firm will be watching you with great interest. Be professional. Take the time to chart a course, and, if working on a mainframe, make sure the owners of your computer do not object to your churning through their data.

The best application to start with is one that exaggerates any concerns you may have had about the product before the salesmen assured you there would be no problem. For example, if your staff encounters problems in getting screens generated, you will want to try your hand at building a system that will locate files through a maze of screens that will make a video game appear dull by comparison.

Are you worried that an intensely interactive system will bring the computer to its knees, but you have trouble telling at just what point this slowdown will occur? Bell the cat by building an interactive system and loading down the computer. Afterward, you will be able to recognize performance problems thundering at you from a great distance.

If your company is bogged down with batch processing, a good objective may be to compare the results of a new system that replaces those old batch suspense files with on-line updates.

One of the advantages of recent marketing is that the vendors, in turning to the issue of rapid prototyping, have painted themselves into a corner with claims of productivity. After years of listening to salesmen suggest that the problem is with your staff, you can now ask them to hand over the keys and stand out of the way while you drive their product around the block.

Step 2: Document yourself. As a manager, you have no doubt been frustrated by your staff's inability to document its work. Here's your chance to lead by example. Begin a log and add to it at the beginning and end of each day. Since you will be programming for effect and moving very rapidly, this log will be invaluable in reporting what was done, particularly once others realize that there was value in

GET SERIOUS

...ABOUT ANALYZING YOUR DATA. You might be spreading your spreadsheet a little too thin. Or maybe you're starting from scratch. But if you're serious about data analysis, you're ready for SPSS/PC+™—a full software family that brings you six high-powered ways to complete any data analysis task.

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your exercise and ask you to capitalize on it.

Do not let this documentation exercise become a witch hunt. Guard any observations carefully and be constantly aware that any confrontation will be hazardous. Vendors have 30 years of experience in such conflicts. Users who slap together a system, test it out and document a few damning flaws can expect the vendor to bring in a ringer who will make the computer do backflips. It then becomes an elementary marketing exercise to discredit the whole evaluation. Do everything by the vendor's book and give the vendor every opportunity to correct the situation and avoid unpleasantness.

DON'T be put off if you don't recognize references to the "elements in a subschema." The price tag is so high that salesmen want you to think you're getting more than simple fields in a file.

Step 3: Define the data. Data is data, just as it always has been and will be until the day computers no longer need it. Don't be put off if you don't recognize references to the "elements in a subschema." The price tag of today's technology is so high that salesmen want you to think you're getting more than simple fields in a file. Tanks worth $80 million have "circular guidance modules;" your car has a steering wheel.

Although some terms may appear unfamiliar at first, you will soon find that the principal change is in the vocabulary. Whether a file is called a table, container, schema or whatever, no product is good enough to read minds. Each field has to be defined as to format (alpha or numeric), length and whether it is key or not.

As you need them, other options, such as phonetic searches and the ability to construct keys from partial or many fields, will emerge. You will not need to become an expert on the DBMS for this exercise.

You should need to define fields only this one time, so do it with some consideration. The power of a fourth-generation language lies in the use of a DBMS and active data dictionary. A field should never have to be redefined once the file has been laid out. If you need to describe fields anywhere else, even for screens or reports, what you are working with is not a finished fourth-generation language. Give the vendor one demerit for premature marketing and expect some delays as you proceed.

Step 4: Lay out the programs. The best method of laying out a program is to envision the system as if it were a company and sketch out an organizational chart. At the top, where the president would be, is probably the main menu. Selections from the menu will send you down to the different "offices," possibly to "offices under offices" and then back up to the top when you're done.

Laying out the program first and making the procedures follow a simple chain of command will provide a concise modular development and prevent you from tripping on needless complexities. Remember, this is just a short test drive, and detours will not be productive.

Never begin actual programming before the files are laid out. Since fourth-generation languages use an active data dictionary, without a defined file you access about 60% of a language. The processing procedures will come automatically from the DBMS, and the field descriptions should come from the dictionary.

Step 5: You are now ready to start programming. Unless you have discovered some new principles of logic, your programs should always follow the same basic pattern:

- Describe the records to process. There will be a clause equivalent to the READ and SELECTION procedures. Your program should never actually deal with a record unless the record is to be processed.
- Instruct the programs to do their processing. Details will vary according to which

IT'S TIME YOU

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This connection allows DEC users to access IBM mainframe power to run complex CAD pro-

program on the chart you are working on. If the program is intended to load data, its instructions will store records. If it is to maintain data, the instructions will be to select and update. If reporting is the goal, the program should be printing.

Here, you will have to overcome your previous experience. You must tell the program only the minimum amount of information to get the job done. If the job is to store a record, you will need instructions that indicate which fields contain what data. If the program is to display, you need to lay out the screen or page.

In doing this, you should never repeat information. The fourth-generation language should know a Social Security number has nine digits; all you should have to tell it is where to put the digits. If you need to supply more information for something as simple as a screen, chastise the vendor for giving your programmers headaches.

The risk of trying to be too fancy in your programming is that all languages allow the defaults to be overridden, and the override code makes the program look just like ones you wrote 20 years ago. You will need to remember that field definitions belong in the data dictionary and should be kept out of the program.

- Tie the modules together with the menu. Each operation should deal only with what must be done on the chart, which records to do it on and when. Set up the selection screens so that criteria is given in ranges.

In this way, the same program that processes the month of October by going after records dated from 861001 through 861031 can process an entire year when 860101 through 861231 is requested. Congratulations — you have efficiently reduced the number of programs and eliminated redundant processing.

Since you were working from a VTOC/HIPO sketch, expect the unexpected and be prepared to add a few overlooked operations during the course of programming.

When filling in, be careful not to overextend a module so that it is doing the work of another module. At the same time, avoid creating another module when one will do the job. Also, take care not to have the same edits repeated in different programs. Add and Change functions, for instance, should share a single screen and validation module. This consolidation can be accomplished on-line by storing a base record and sending it through the update module for completion; in batch, you can load the records dirty and reconcile them at a later date.

> COMPUTERS do not make good explorers. Each program should return through the same path it traveled, even if it touches each program for only a moment.

- Set the protocol. Computers do not make good explorers. Each program should return through the same path it traveled, even if it touches each program for only a moment. Most fourth-generation languages maintain some method of storing instructions to take over when a program ends that lets it leave a footprint before sending the logic to the next module. When the last program ends — way down at the bottom of the chart — the logic has only to follow the bread crumbs out of the forest.

If this "fetchback" ability is not as simple as described — and you should check carefully, as vendors are inclined to complicate issues they do not understand — you will have to provide a separate control module, standards and possibly a support file before you continue.

You could try to build your first system without fetchback, but the risk of getting lost in it is too high. You deserve a break by now, anyway, so take the time to do it right and give the vendor another demerit.

Step 6: Check things out with a real live user. Assuming that you followed the advice about letting people know what you were doing, others in the

TWO GOT ALONG

grams, manufacturing applications and other CPU-intensive operations when necessary. So programs that once took hours to run can now be run in minutes.

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company could be most interested in seeing your results.

Remember, your objective is not to build a system but to build a first system. Users always know what they want and will tell you as soon as they see it. Expect a deluge of change requests.

But don't make the changes yourself. Like Uncle Remus's B'rer Rabbit and Tar Baby, once you've got a hold of it, you'll never be able to let the program go.

Instead, take out your logbook and diligently write down the request. Even though you know by this time that you can make the change in two minutes, resist the urge to show off and concentrate instead on documenting how close you came and the time it took to get to that point.

Step 7: Overload the system. At this time, you want to see what happens when the baby kicks the slats out of its cradle. This is a fourth-generation language, so you should be able to replicate the entire file with a simple program, such as:

```
REPEAT 1000 TIMES
GET EVERY RECORD
STORE WITH SAME
 INFORMATION
```

Again, expect some trouble. The file may need to be adjusted for volume, but this adjustment period is a good time to find out what is required. No demerits to the vendor unless you find the system needs adjusting more than twice.

At this time, you should check carefully for effects on overall machine performance. Include the operation of other jobs in your examination to make sure your programs haven't gummed up the works.

If everything has been set up right, you should experience about the same amount of slowdown as when your overweight Uncle Nelson settled into the backseat of your car — the system should continue to operate, even thouqh it may protest slightly on an uphill grade.

Step 8: Review your findings. At this point, you will want to give the vendor a call to fix any problems. Give the vendor every benefit of the doubt and offer to turn the system over to his staff for a few days.

> IN ADDITION to gaining an appreciation of the fourth-generation language, you will find less resistance to your leadership from the Young Turks on your staff.

Now that you have ventured into programming and succesfully returned, you can assess the yields of your investment. For one thing, you may be able to use this exercise to support your recommendation to bring in a fourth-generation language, or you may decide to wait.

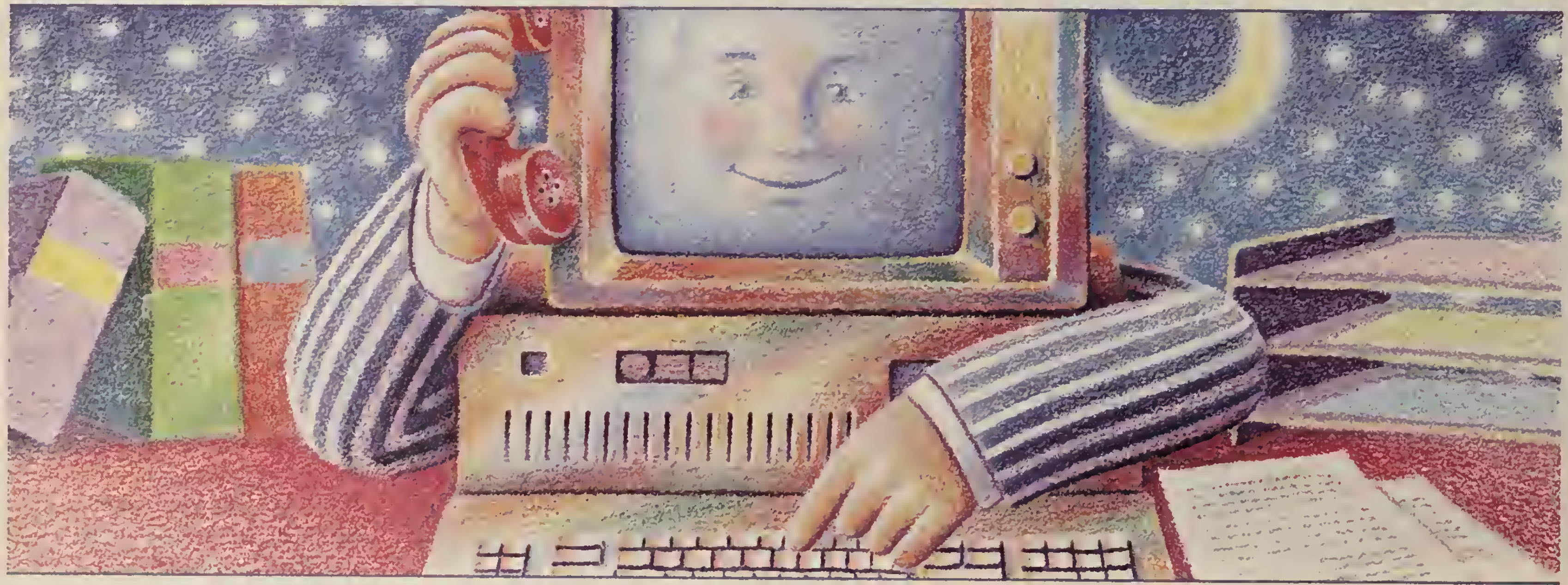
In addition to gaining an appreciation of the fourth-generation language, you will find less resistance to your leadership from the Young Turks on your staff, and you will be able to prepare realistic schedules and plans of which you are confident.

Also, you can specify standards that will appear sympathetic, and your staff will see you as supportive rather than restrictive. Your staff will benefit because it is following an actual pace rather than trying to live up to a salesman's promise. And if you were fortunate enough to choose an application that offers some utility, your firm will be able to enjoy the same early advantage of the new technology.

There is one other advantage you may have overlooked. Since you could not help but bring your old skills into this new environment, there is a high probability that some of those old tricks work well with the new language. Chances are your project will also be the first time anyone has seen programming done that way. If this happens, try to act modest, not surprised, when you are complimented for your innovativeness and prowess — don't tell them that you were doing that 15 years ago and simply didn't know better.

Instead, you are entitled to put your hands behind your head, prop up your feet and graciously acknowledge the compliment with the observation that now you know why you got the big desk. •

NIGHT SHIFT



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MANAGEMENT

TAKING CHARGE

George Mitchell

Thinking in circles

As office automation becomes a reality, hurtling office technology toward the 21st century, the designers of modern offices seem to be trapped in a time warp.

We are entering the information age with centuries-old trappings. Today's "open plan" offices are modern-day sweatshops, with row upon row of rectilinear desks connected by snaking wires and cluttered with telephones, computer terminals and personal computers, printers, files and other sundry office items.

The information age has created an office revolution that parallels the industrial revolution. Already, more than 60% of this industrial nation's work force reports to an office building each day, and as much as 90% will be office-bound by the turn of the century.

But while the industrial revolution transformed work and the factory workplace, no such transformation is accompanying today's revolution.

Instead, the tools of the information trade and their users are being moved — often squashed — into the same old, rectilinear office designs, despite their dramatically different set of requirements. By think-

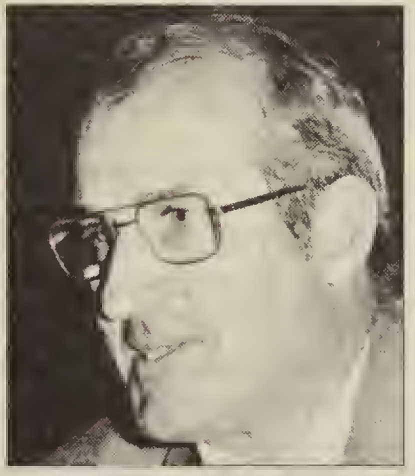
Continued on page 98

Synnott leaving Bank of Boston

BY DAVID A. LUDLUM
CW STAFF

BOSTON — William R. Synnott, the longtime top information systems executive at Bank of Boston Corp. and author of two books on information systems, will leave the company at the end of this month to work as a consultant with The Yankee Group.

Synnott's successor is already working as Bank of Boston's chief information systems executive. John H. Rogers, a former consultant and executive vice-president of Ameritrust Corp. in Cleveland, joined the company in October 1986 as director of corporate information and technology, reporting to the president.


William R. Synnott

Rogers, 49, brings an emphasis on general banking experience rather than information systems to the top technology post at Bank of Boston.

Synnott, 57, who oversaw a decentralization of Bank of Boston's applications support in 1984 as the corporation was realigned into five operating groups, is director of corporate information systems and services, reporting to Rogers.

He strongly supported the decentralization of information systems and approached management last summer about retiring from the company, Rogers says.

Synnott, who wants to work beyond the age of 65, feels he could do so more readily as a consultant than at the bank and wants to start establishing himself as a consultant now, Rogers says. Synnott declined to comment on his departure.

Synnott, who took charge of

Continued on page 99

MIS TV slated to premier this fall

Coverage may include product announcements; 'tech celebs' sought

BY DAVID A. LUDLUM
CW STAFF

NEW YORK — Information systems managers pleading "I want my MTV" may not be yearning for the music television network due to acute stress, but thinking of MIS TV instead.

In September, Private Satellite Network, Inc. (PSN), which operates private television services for corporations and two subscriber networks, plans to launch Insite, a subscriber service aimed at information systems managers.

PSN plans to limit Insite to two to three hours of new programming a week with a similar volume of reruns, according to Joseph Rizzo, vice-president of business development, who is in charge of Insite. "We found that people really need to work while they're at work and not watch television," he adds.

To date, the company has identified one Insite show it will produce. Titled *Insite Focus,* it is to feature spokesmen for several vendors discussing a topic such as desktop publishing.

PSN also plans to carry seminars produced by third parties. It has acquired rights to transmit five seminars put on by The Yankee Group, the first two of which will be about Digital Equipment Corp. and IBM, Rizzo says.

Viewers would receive most programming through payment of a monthly subscription charge, although additional pay-per-view fees might be required to receive some shows.

PSN plans to produce about half the programming itself; the other half will be produced by vendor companies that purchase Insite airtime, Rizzo says.

The vendor programs, including product presentations and

Continued on page 100

Bill would cut system monitoring

BY JEFFRY BEELER
CW STAFF

SACRAMENTO, Calif. — A legislative committee recently began hearings on a proposed law that would drastically curtail the use of systems that monitor the telephone activity and work performance of office employees.

Assembly Bill 1279 (A.B. 1279) took its first step toward eventual passage or rejection when it was heard before the California Assembly's Labor and Employment Committee.

Introduced on March 3 by Assemblyman Tom Hayden, the bill addresses several categories of electronic monitoring aids, including the following:

- Software packages that allow employers to measure the output of individual workers at their terminals or workstations.
- Devices that enable supervisors to tap their subordinates' phones and eavesdrop on their conversations.
- Card readers that track employees' comings and goings in company parking lots, building entrances and the like.
- Programs that flash subliminal messages to office workers through their personal computer or terminal display screens.

A forthcoming report by the Office of Technology Assessment, a federal body, finds that approximately 20% of all termi-

Continued on page 99

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Thinking

FROM PAGE 97

ing in circles instead of straight lines, however, forward-thinking designers can reduce the pain of today's office revolution.

Astonishingly little has been done to accommodate the VDT — the symbol of office automation — and its user despite the dramatic change it is rendering to workers and the nature of work.

While rising VDT use is not the only factor that cries out for a new office design perspective, the following demands provide dramatic evidence of the need for an entirely new approach to office design:

- The VDT screen must be plugged in, not just to a central electrical system but to a widening array of peripherals — telephones, printers, CPUs and so on. The result is often a snake pit of unsightly — and dangerous — wires.
- The terminal must be safe to use. The proliferation of desktop machinery puts new demands on ventilation and air-conditioning systems that must offset the heat the machines generate and also refresh the air around workers, some of whom are more intensely desk-bound than ever before.

Unanswered questions about radiation emission from VDTs, not to mention fumes from building materials and the concern about "sick buildings," also begs for openness on either side of the screen.

- The VDT must be easy on the eyes. A video screen is a mirror. The introduction of this eye-level mirror to the work space is in direct conflict with today's open offices, with their glossy surfaces and windowed walls.
- The machine must be comfortable to use. Ergonomics has entered the design vocabulary faster than it has entered the work space. In 1983, only 6% of all office chairs were ergonomically adjustable, according to the National Office Products Association.

Adjustable seating is now the fastest growing segment of the office furniture industry, yet the association estimates that it will only represent 20% of all office seating by 1988.

Work surfaces, another essential factor in the comfort of VDT users, are still overwhelmingly designed on the desktop-with-typewriter-return configuration, which treats the VDT as an obtrusive add-on.

And with the addition of keyboards, individual printers and other office equipment, the desk has become a cluttered space — not the most conducive to worker comfort or productivity.

The bottom line

When the requirements of office automation are combined with the cost of office real estate, the case for a re-evaluation of design perspectives becomes even more apparent.

BY TEARING down preconceived notions of what an office should look like, office design can meet today's and tomorrow's space requirements.

Space is expensive. After people, it represents most companies' largest overhead cost. No cost-efficient, competitive company can squander space.

As space costs increase, the common response is to squeeze the dimensions of each work space. The result is an "ice-cube tray" design: Rows of rectilinear cubicles, fitted with components based on the work-surface-with-typewriter-return principle and given a cosmetic coating of current fashion colors.

Furthermore, change comes fast and often. More than 30% of all office workers now move from one work space to another each year. Companies can afford neither the time nor the expense of tearing down walls to accommodate these shifts.

The solution to date has been open-plan systems furniture. Unfortunately, most systems are cast in the mold of their stand-alone forebears. They address the company's need for flexibility at a sacrifice of the users' needs.

And they are overwhelmingly based on the shapes and dimensions of traditional office furniture. In the hands of tradition-bound office designers, even the most flexible and diverse systems mimic the office of past.

As a consequence of these developments, privacy erodes. The actual, physical privacy of an enclosed office — once a prized rung on the ladder of success — is neither necessary nor practical for most office workers today.

Yet speech privacy, an acoustical term, and the worker's need for territory of his own are increasingly important if productivity is to be maintained.

Traditional, rectilinear office design does not serve this combination of office requirements any more than craft shops met the needs of the industrial revolution.

Breaking barriers

By tearing down preconceived notions of what an office should look like, office design can meet today's and tomorrow's office space requirements.

One telemarketing firm was able to accommodate a 36% increase in both workstations and workers in its existing space by moving from a typical, rectilinear design of cubicles to one arranged in wedges around a central core. At the same time, each employee's work area increased from 1,800 to 2,570 sq. in.

The atmosphere of each workstation was more open, yet complaints of interfering noise from adjacent stations ended. Wiring for the company's vast telecommunications network, air filtration, task lighting and acoustical control were all accommodated, unobtrusively integrated within the core.

Continued on page 99

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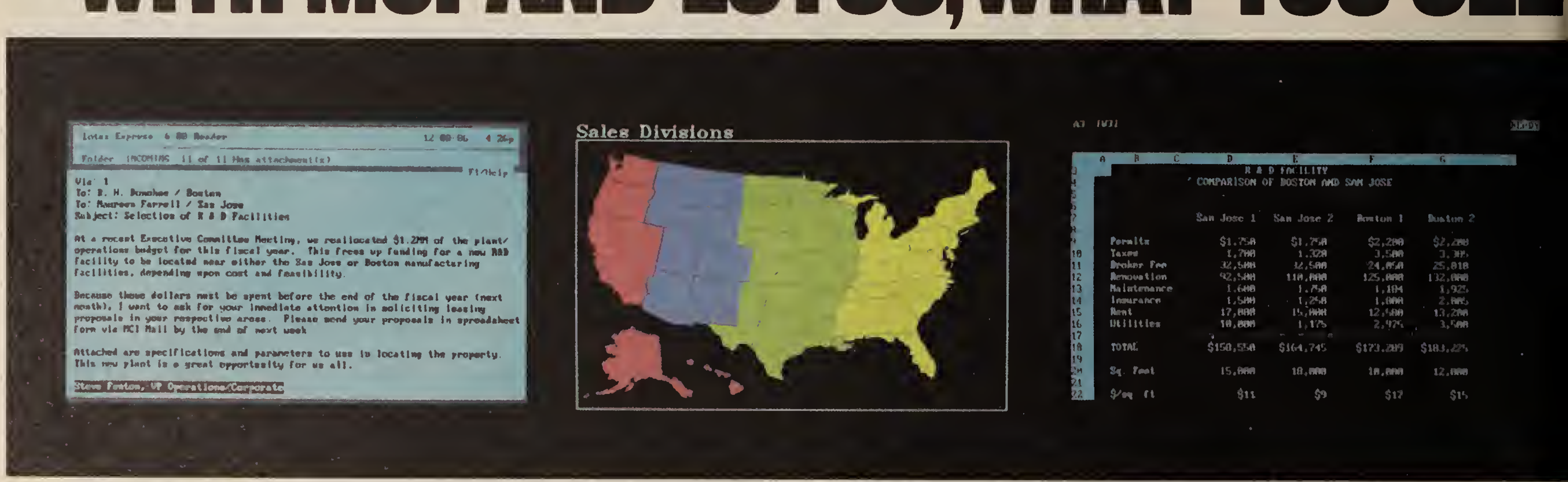

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 6
 7                    San Jose 1   San Jose 2    Boston 1     Boston 2
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10   Taxes                1,700        1,320        3,500        3,300
11   Broker Fee          32,500       32,500       24,050       25,818
12   Renovation          92,500      110,000      125,000      132,000
13   Maintenance          1,600        1,750        1,104        1,925
14   Insurance            1,500        1,250        1,000        2,005
15   Rent                17,000       15,000       12,500       13,200
16   Utilities           10,000        1,175        2,975        3,500
17
18   TOTAL             $150,550     $164,745     $173,209     $183,225
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20   Sq. Feet            15,000       18,000       10,000       12,000
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22   $/sq ft                $11           $9          $17          $15
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Lotus Express runs in the background. It automatically picks up your mail and stores it on

Synnott

FROM PAGE 97

the company's electronic data processing services in 1970, has assisted with the transition in leadership "in spades," Rogers adds.

Rogers studied political science as an undergraduate at Yale University and finance in getting an MBA from Harvard University. He worked for the finance and insurance subsidiaries of Ford Motor Co. and at Ford for seven years before heading the human resources department at Ameritrust for 10 years.

In 1979, he says, he was "drafted" to head up Ameritrust's corporate operations, which included electronic and paper processing. He did that until 1983, when he became an independent consultant specializing in what he calls "strategic use of information and strategic use of human resources from a top management perspective."

'Transcending groups'

Rogers says his relatively nontechnical orientation reflects the depth of the technical ability Synnott has built at Bank of Boston. "My role is to address systems issues which are of a corporate nature — issues that transcend the groups, such as architecture, the structure of processing applications, telecommunications issues, network issues, separation of information and access to information from processing," he says.

Bank of Boston, which maintains a centralized corporate computer center, reorganized to achieve greater accountability and "to get the folks operating the business close to the customer base," Rogers says.

Rather than leading to layoffs or early retirements, the decentralization of information systems has probably prompted modest expansion of systems personnel, he adds.

At The Yankee Group, Synnott will be a senior director with the communication and information systems corporate planning service, heading up research and services for banking and issuing reports on topics such as linking computer strategies to corporate strategies, according to Howard Anderson, the firm's president.

Rogers says he gave up consulting because of constant travel and little free time. "I was lucky to have four hours with my family in the course of a week," he says. "I was just killing myself. There's no amount of money that's worth that."

Thinking

FROM PAGE 98

The designer did not break the laws of physics. He broke the rules of tradition. He put his own need to create a beautiful interior behind the performance requirements of the workers and the limits of the space.

This is rare. Too often, the designer's view of performance and aesthetics is at odds with the actual user's view.

While there may be valid arguments for leaving purely aesthetic considerations to the designer, there are almost none for putting aesthetics ahead of worker comfort and performance.

The user's needs — not the designer's aesthetic sense — must take precedence.

Linear thinking seldom provokes great insights. Maybe architect Frank Lloyd Wright — that great lover of circles — was right after all.

Mitchell is president of Centercore, Inc.

Monitoring

FROM PAGE 97

nals are monitored electronically and that the performance evaluations of 4 million to 6 million office workers are based at least partly on computer-collected statistics, according to Sharon Danann, a researcher with clerical union 9 to 5, the National Association of Working Women.

Although A.B. 1279 would stop short of flatly outlawing the practice of electronically monitoring worker performance, the bill would bar employers from doing so surreptitiously, according to Hayden's administrative assistant, Judy Corbett.

If passed, the proposed legislation would permit managers to monitor a work group or department's collective output for one hour each day but would forbid the gathering of performance statistics on individual workers, Corbett said.

Stiff opposition

Some of the bill's proposals, especially those governing when and from whom employers can gather performance statistics, are almost sure to meet stiff industry opposition. "We expect to hear from the airlines and telephone companies" — two of the foremost practitioners of output monitoring and other forms of employee surveillance — Corbett said.

The Computer and Business Equipment Manufacturers Association (CBEMA) agreed that employees have the right to be notified of electronic monitoring and have access to all pertinent performance records in the event of a dispute.

But CBEMA said it opposes efforts to limit the practice to prescribed periods. "The restriction to one hour a day would make most forms of computer monitoring impossible," said Charlotte Legates, the organization's director of communications.

Responsibility

The association also said it opposes all attempts to halt the collection of performance statistics for individual workers. Such a constraint runs counter to the accepted American principle of "holding employees responsible for the quality and quantity of their work," Legates said.

A.B. 1279 proposes an outright ban on the workplace use of subliminal messages.

However, Hayden's aides are unable to cite even one instance in which the mind influencing technique is in place.

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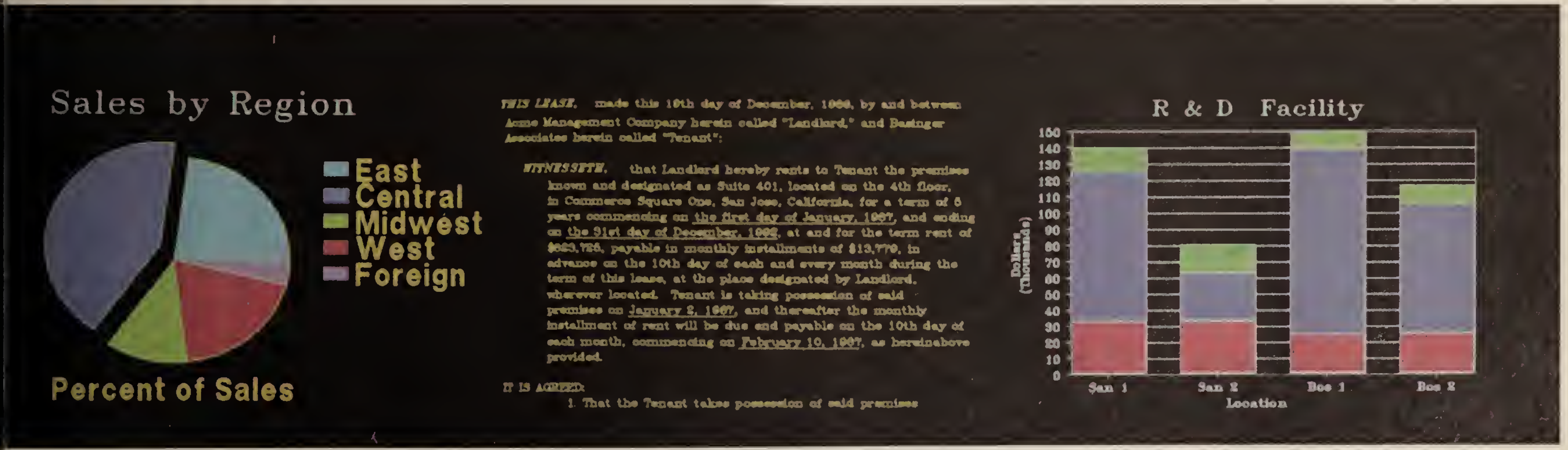

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WITNESSETH, that Landlord hereby rents to Tenant the premises known and designated as Suite 401, located on the 4th floor, in Commerce Square One, San Jose, California, for a term of [illegible] years commencing on the first day of January, [illegible], and ending on the 31st day of December, [illegible], at and for the term rent of [illegible], payable in monthly installments of $13,779, in advance on the 10th day of each and every month during the term of this lease, at the place designated by Landlord, wherever located. Tenant is taking possession of said premises on January 2, [illegible], and thereafter the monthly installment of rent will be due and payable on the 10th day of each month, commencing on February 10, [illegible], as hereinabove provided.

IT IS AGREED:

1. That the Tenant takes possession of said premises

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CALENDAR

APRIL 26-MAY 2

Tangent (Tandy Computer Business Users Group) Fifth Annual Conference. Fort Worth, Texas, April 26-29 — Contact: Any Radio Shack Computer Center or Tandy Corp., 1800 One Tandy Center, Fort Worth, Texas 76102.

National Workshop & Computer Systems Demonstrations. Kansas City, Mo., April 26-29 — Contact: Management Systems Committee, American Trucking Associations, 2200 Mill Road, Alexandria, Va. 22314.

1987 Association for Systems Management Annual Conference. Louisville, Ky., April 26-29 — Contact: Richard B. McCaffrey, ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

Cinteract '87. San Diego, April 26-30 — Contact: Cincom Systems, 2300 Montana Ave., Cincinnati, Ohio 45211.

Expo Bank Asia 87 Conference. Osaka, Japan, April 27-28 — Contact: Expo Bank Asia 87 Conference, E. J. Krause & Associates, Inc., Japan, 11-14 Akasaka 3-Chrome, Akasaka Bergo Hoei 805, Minato-Ku, Tokyo, Japan 107.

1987 Association for Information and Image Management Show. New York, April 27-30 — Contact: Steve Saft, AIIM, Suite 1100, 1100 Wayne Ave., Silver Spring, Md. 20910.

Speech Tech '87. New York, April 28-30 — Contact: Margo Kelly, Media Dimensions, Inc., 42 E. 23rd St., New York, N.Y. 10010.

Corpcon. Chicago, April 28-30 — Contact: Linda Morris, Corpcon, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held Sept. 21-23 in Los Angeles.

Dexpo South '87. Nashville, April 28-30 — Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

BMC Software User Group's Second Annual Meeting. Houston, April 29-May 1 — Contact: Marianne Levandoski, AT&T, Room 50-51A40, 30 Knightsbridge Road, Piscataway, N.J. 08854.

IBX Users Group Association 12th Meeting. Irvine, Calif., April 29-May 1 — Contact: Elizabeth Stockwell, Wang Laboratories, Inc., Mail Stop 013-038, One Industrial Ave., Lowell, Mass. 01851.

19th Annual International Management Information Systems Conference. Cambridge, Mass., April 29-May 1

Continued on page 101

MIS TV

CONTINUED FROM PAGE 97

training segments, will be identified as having been produced by the vendor, and PSN will expect them to have educational value, according to Rizzo, who describes such programs as "marketing communications" rather than "hard-core advertising."

"We will not permit vendors to come on and do a hard sell. They need to be doing education," Rizzo says. Vendors already produce video programs that often are transmitted via relatively expensive portable receiving equipment, he notes.

PSN also may carry product announcements and trade show broadcasts. It has a verbal agreement to broadcast from the upcoming Decworld conference in Boston, according to Rizzo.

Another program concept being considered is user-to-user forums, featuring MIS managers from a major corporation outlining its strategy and taking telephone calls from viewers in a manner Rizzo likens to Phil Donahue's television show. "We want this to be talk televison," he says.

Rizzo says he hopes "tech celebs" such as Yankee Group President Howard Anderson or seminar leader James Martin might host a series.

PSN is developing an advisory council intended to help Insite maintain its focus, in part by reviewing program concepts and excerpts. The council now includes Anderson; William Friel of J. C. Penney Co.; Dan Cavanuagh of Metroplitan Life Insurance Co.; and William Rush of Prudential-Bache Securities, Inc.

The company plans to peg the Insite subscription rate in "the low hundreds of dollars per month" and charge an installation fee of less than $1,000, Rizzo says. "We're looking to penetrate the market early and fast," he adds.

PSN is targeting a market of 3,500 top corporations that together spend about about $50 billion a year on information systems.

Of those, it hopes to sign 10% before the end of the network's first year, which starts Aug. 1, Rizzo says.

Initially, transmission will be to the continental U.S. After six months, PSN plans to market the service internationally.

PSN, a privately held New York-based concern, already operates 15 private television networks for internal corporate use as well as subscription networks for professional investors and the legal community.

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Chris Veal, Partner, Regional Director of Micro Applications, Arthur Young.

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When Arthur Young added all that up, they got a very short list.
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Microsoft Word is available for the IBM PC and compatibles and the Apple Macintosh.

For the name of the nearest Microsoft dealer, call (800) 426-9400. In Washington State and Alaska, (206) 882-8088. In Canada, call (416) 673-7638.

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Continued from page 100

— Contact: Scott A. Baumruck, Paper Industry Management Association, 2400 E. Oakton St., Arlington Heights, Ill. 60005.

MAY 3-9

AUUA, Inc. (Sperry Users) Spring Conference. Orlando, Fla., May 3-7 — Contact: Gay & Taylor, Inc., P.O. Box 1410, Winston-Salem, N.C. 27102.

BLIS/COBOL Users Group Annual Meeting. Orlando, Fla., May 3-7 — Contact: BLIS/COBOL Users Group, Suite 110, 222 S. Westmonte Drive, Altamonte Springs, Fla. 32715.

Eighth Annual Meeting of the International Association of Synercom Users. Houston, May 3-7 — Contact: Gary Carson, Synercom, 10405 Corporate Drive, Sugar Land, Texas 77478.

Second International Conference on Supercomputing and First World Supercomputer Exhibition. Santa Clara, Calif., May 3-8 — Contact: Lana Kartashev, Dynamic Computer Architecture, Inc., Suite B-309, 3000 34th St. S., St. Petersburg, Fla. 33711.

Computers & Communications in the Healthcare Industry. Dallas, May 4-5 — Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Eastern Communications Forum 87. Stamford, Conn., May 4-6 — Contact: ECF, 505 N. Lake Shore Drive, Chicago, Ill. 60611.

BankAI. Brussels, May 5-6 — Contact: Society for Worldwide Interbank Financial Telecommunications, AI Business Unit, Avenue E. Solvay 81, 1310 La Hulpe, Belgium.

Eighth National Online Meeting. New York, May 5-7 — Contact: Learned Information, Inc., 143 Old Marlton Pike, Medford, N.J. 08055.

18th Annual Meeting of the ASI Users' Group. New Orleans, May 5-8 — Contact: University of Michigan, Data Systems Center, 2021 Administrative Services Building, Ann Arbor, Mich. 48109.

Second International Optical Storage Forum. Denver, May 6-8 — Contact: Cartlidge & Associates, Inc., Suite M259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

1987 International Conference & Exhibition on Health Industry Bar Coding. Atlanta, May 6-8 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238.

MAY 10-16

APL87. Dallas, May 10-14 — Contact: APL87 Registrar, Suite 210, 440 Northlake Shopping Center, Dallas, Texas 75238.

VIP '87 — Duquesne Systems International Users Group. Chicago, May 11-12 — Contact: Donna Bartko, Duquesne Systems, Inc., Two Allegheny Center, Pittsburgh, Pa. 15212.

Audit Managers' Symposium IX. Hilton Head Island, S.C., May 11-13 — Contact: Jane Evans, MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

CD-I/The Future Conference. San Francisco, May 11-13 — Contact: Carol Peters, Online International, Inc., 989 Avenue of the Americas, New York, N.Y. 10018.

Desktop Publishing '87. San Francisco, May 11-13 — Contact: Carol Peters, Online International, Inc., 989 Avenue of the Americas, New York, N.Y. 10018.

Intercompany Networks: Strategy and Implementation. New York, May 12-13 — Contact: William Smulsky, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Infobase '87 — International Database Exhibition and Congress. Frankfurt, West Germany, May 12-14 — Contact: Messe Frankfurt GmbH, Ludwig-Erhard-Anlage 1, POB 97 01 26, D-6000, Frankfurt 97, West Germany.

Avignon 87 — Expert Systems and their Applications. Avignon, France, May 13-15 — Contact: Avignon 87, B.P. 45, 92193 Meudon-Cedex, France.

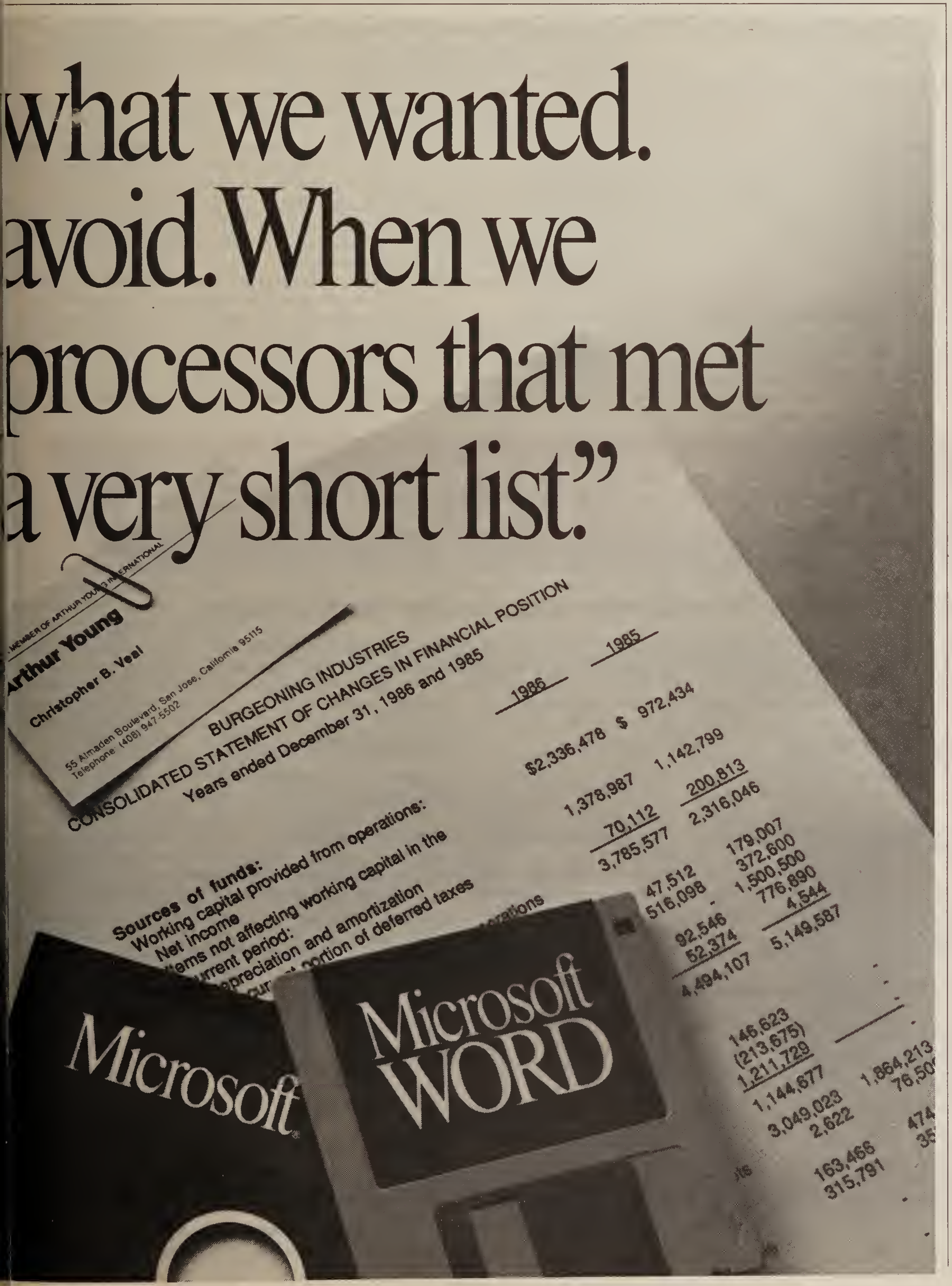
Network Users Association Spring Meeting. Atlanta, May 13-15 — Contact: Network Users Association, Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Federal Conference on Electronic Publishing. Bethesda, Md., May 13-15 — Contact: Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

Eighth Annual Computer Law Institute. Los Angeles, May 14-15 — Contact: University of Southern California Law Center, University Park, Los Angeles, Calif. 90007.

Impact 87 — Technology in Tomorrow's Classroom. Victoria, B.C., May 14-17 — Contact: Conferences Services,

Continued on page 102



Continued from page 101

Box 1700, University of Victoria, Victoria, B.C., Canada V8W 2Y2.

MAY 17-23

Infoweek '87. Dallas, May 17-20 — Contact: Uccel Corp., Marketing Communications c/o Financial Systems Division, P.O. Box 660054, Dallas, Texas 75266.

International Communications Association 1987 Conference & Exposition. New Orleans, May 17-22 — Contact: ICA, Suite 710, LB-89, 12750 Merit Drive, Dallas, Texas 75251.

The Challenge of Evolving Technologies Conference. Orlando, Fla., May 18-20 — Contact: Scott K. Allen, Life Office Management Association, 5770 Powers Ferry Road, Atlanta, Ga. 30327.

Hammer Forum West — Harnessing New Technology: From Vision to Reality. Los Angeles, May 18-20 — Contact: Michael Hammer, Hammer Forum West, 5 Cambridge Center, Cambridge, Mass. 02142.

Meeting of the Minds '87, ADP National Accounts Division Users' Conference. Boston, May 18-20 — Contact: Automatic Data Processing, Suite 580, 5665 Northside Drive, Atlanta, Ga. 30328.

Patricia Seybold's Technology Forum — Tools for Visionary Business Users. Cambridge, Mass., May 18-20 — Contact: Patricia Seybold's Office Computing Group, Suite 612, 148 State St., Boston, Mass. 02109.

Eighth Annual Conference on Applications of Computer-Aided Systems Engineering Tools. Ann Arbor, Mich., May 18-22 — Contact: Rebecca S. Sizemore, Meta Systems, Ltd., Suite 200, 315 E. Eisenhower, Ann Arbor, Mich. 48108.

Second International Symposium on the Factory of the Future. Montego Bay, Jamaica, May 18-22 — Contact: David W. Russell, Pennsylvania State University Graduate Center, 650 S. Henderson Road, King of Prussia, Pa. 19406.

Western States Government Technology Conference 87. Sacramento, Calif., May 19-21 — Contact: Government Technology Conference, P.O. Box 160288, Sacramento, Calif. 95816.

Technobank. Geneva, May 19-22 — Contact: Technobank, P.O. Box 625, CH-1211 Geneva 1, Switzerland.

Interconnections '87, the Independent Computer Consultants Association's 10th Annual National Conference. May 20-22, San Francisco — Contact: ICCA, P.O. Box 27412, St. Louis, Mo. 63141.

Distribution Computer Expo. May 21-22, Chicago — Contact: C. S. Report, Box 453, Exton, Pa. 19341.

1987 NYU Symposium: Technological Support for Workgroup Collaboration. May 21-22, New York — Contact: Center for Research on Information Systems, New York University, 90 Trinity Place, New York, N.Y. 10006.

MAY 24-30

Workshops on Computer-Assisted Map Analysis. New Haven, Conn., May 27-28 — Contact: Joseph K. Berry, School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511.

Computer and Network Security '87. Washington, D.C., May 27-29 — Contact: Institute for International Research, Inc., Suite 1212, 310 Madison Ave., New York, N.Y. 10017.

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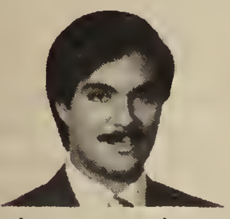

Clinton Wilder

Rankings are rite of spring

Ah, spring again. Time for tax return filings, reflections on first-quarter results and a slew of corporate annual meetings.

And it's also time for that annual end-of-April ritual: the ranking of the U.S.'s largest industrial corporations by *Fortune* and *Forbes* magazines. As usual, the listings provide a useful benchmark for comparing the computer industry's major players with their counterparts in other industries. Although 1986 was certainly not a banner year for computer firms in general, the outstanding performances of a handful stood out in the U.S. business world.

But first, the bad news. Along with everything else that went wrong for IBM in 1986, it also relinquished its long-held mantle as the world's most profitable corporation. Big Blue's 27% drop in net income to $4.79 billion brought it down to second place on the *Fortune* list behind Exxon Corp., which increased profits 10% to $5.36 billion. But IBM remained comfortably ahead of No. 3 Ford Motor Co. at $3.28 billion.

IBM climbed a notch in sales to No. 4, behind General Motors Corp., Exxon and Ford. To keep things in perspective in this era of IBM-bashing, it is worthwhile to point out that IBM's revenue was nearly seven times that of the computer industry's No. 2 company, Digital Equipment Corp., whose fiscal year ends June 30. But even IBM is dwarfed by GM, which is double the size of Big Blue and, to no one's surprise, is the world's first $100 billion company.

In the "year of DEC," the Maynard, Mass.-based IBM nemesis jumped 11 spots to No. 44 on the *Fortune* 500 sales list and vaulted to No. 24 in net income. *Forbes* recognized DEC's meteoric 1986 stock market ride as DEC scooted to 17th place in market value from 39th the previous year. DEC's 71% gain in market value was great-

Continued on page 105

Industry earnings promising

BY ALAN J. RYAN
CW STAFF

Struggling Wang Laboratories, Inc. last week announced that its earnings for the third fiscal quarter had surpassed the break-even level it had targeted for the period, but analysts said the company should not become overly confident.

Meanwhile, the computer industry in general appears to be doing better. NCR Corp. recorded record sales and earnings for a first quarter, up 17% and 22%, respectively, from last year. Apple Computer, Inc. posted a 41% increase in sales and a 6% hike in earnings.

Wang. Analysts said the Lowell, Mass.-based office information vendor's earnings were better than expected. The quarter marked Wang's first quarterly profit of its fiscal year.

Wang posted earnings of $5.9 million, a decrease of 72% from last year's third-quarter earnings of $21.4 million. Sales grew to a record $745.9 million, an increase of 9% over the $685.3 million reported in the like quarter last year.

"I didn't think they would turn a profit until the fourth quarter," said John McCarthy of Forrester Research, Inc. in Cambridge, Mass. "This gives [Wang President] Fred Wang some breathing room, both with Wall Street and internally." McCarthy added that the profitable quarter should eliminate ongoing rumors of layoffs and could begin a turnaround for the firm.

However, McCarthy cautioned, "I don't think anybody should be fooled by these results. Wang has some long-term battles that it's going to have to face — some deep-seated management and organizational problems it is going to take a long time to root out."

"The thing that concerned me a little bit in the quarter was their order rate," analyst Stephen Smith of Paine Webber, Inc. said. "Orders were down 4% from last quarter and were actually below the level I think necessary to break even. . . . It doesn't exactly suggest a major improvement is under way."

1987 first-quarter earnings

IBM is still sluggish, but NCR, Apple and others show signs of strength

Company	*Net Income Jan.-March (millions of dollars)*	*Percent Change From 1986*	*Revenue Jan.-March (millions of dollars)*	*Percent Change From 1986*
Apple	33.9	+6	575.3	+41
Honeywell[1]	43.7	+20	1,500	+29
IBM	785	−23	10,681	+5
NCR	61.5	+22	1,121	+17
On-Line Software International, Inc.	1.5	+117	19.8	+126
Seagate Technology	40.5	+8	267.1	+6
Wang	5.9	−72	745.9	+9

[1] Excludes Information Systems business.

CW CHART

In a press conference last week, Fred Wang said his goal was to cut expenses by $50 million; to date, his company has cut $42 million. Wang said the company's European groups have said they are unable to cut ex-

Continued on page 107

Strapped BPI sold for $10.7M

BY CLINTON WILDER
CW STAFF

GARDEN CITY, N.Y. — Seeking to bolster its market leadership in microcomputer accounting software, Computer Associates International, Inc. has made a $10.7 million tender offer to acquire financially ailing BPI Systems, Inc.

The acquisition, subject to approval by BPI shareholders, would give Computer Associates two accounting product lines to bracket its Easy Business series, priced at $595 per program. BPI sells the Enterprise software series for $795 per module and an entry-level accounting package

Continued on page 106

Inside

- AMD accuses Intel of noncompliance with agreement. Page 104.
- Tandon enters agreement to acquire Winchester drive maker for $5 million in stock. Page 105.
- Amdahl founder elected CEO of Silicon Valley power supply vendor. Page 107.

Sorbus says IBM cuts service costs to sell hardware

BY CLINTON WILDER
CW STAFF

FRAZER, Pa. — IBM's recently announced service price cuts are primarily a lever to increase sales of its hardware, according to the president of the largest independent computer maintenance firm in the U.S.

Sorbus, Inc. President Louis J. Ross suggested that IBM's action [CW, April 6] was motivated by account control and that IBM is willing to sacrifice its lucrative profit margin on service in order to lock in hardware sales.

"Account control is shifting from the provider of the box to the provider of the service, and I think this is part of IBM's concern," Ross said in an interview last week. "The fact is, IBM has more success on sales proposals in shops where they have the service vs. shops where they don't. Instead of driving service as a profit center, they are going back to making service supportive of their marketing efforts."

In response to IBM's move, Ross said Sorbus will announce a series of price cuts and other service policy changes before the new IBM Corporate Service Amendment (CSA) takes effect on June 1. He said Sorbus will not make across-the-board price cuts comparable to IBM's but that the firm does plan to offer a combination of lowered prices and other customer incentives.

"If I end up cutting prices as much as IBM, I don't think I've done my homework," Ross said. "Sorbus is not strictly bidding on price anymore. That may have been our strategy initially to penetrate the market, but some companies like ours have proven that there are other advantages to independent service."

Ross said that even before the CSA revamp, IBM had become more aggressive on its maintenance contract terms in some situations. "Historically, it was always, 'Here's the IBM offer and here's the Sorbus offer.' But now we're never sure when the IBM offer has stopped," he said. "It's not the way they have normally done business."

Louis J. Ross

A former IBM service manager suggested that with the new CSA, IBM will begin phasing out its so-called special bids program. "I think they would like to be out of that business," said Don Goodspeed, now president of Computer Maintenance Consultant Ltd.

Ross acknowledged that if IBM persists in lowering both its own profit margins and those of the third-party maintenance industry, Sorbus will attempt to reduce its own cost structure and intensify its efforts to service non-IBM equipment.

"We know we can't make a silk purse out of a sow's ear," Ross said. "This is something that has to be managed, but we feel we can improve our productivity. We'll try to cut down on what we call 'windshield time,' where our people are spending more time traveling between sites than they are repairing."

To expand its non-IBM business, Sorbus said it hopes to service more Digital Equipment Corp. computers through a relationship with Electronic Service Specialists Ltd., a DEC hardware refurbisher recently acquired by Sorbus parent Bell Atlantic Corp.

AMD: Intel shirked tech swap

BY JAMES A. MARTIN
CW STAFF

SUNNYVALE, Calif. — Advanced Micro Devices, Inc. (AMD) said recently that Intel Corp. has not complied with a technology exchange agreement under which Intel was to transfer to AMD its 8087 math coprocessor and 80386 microprocessor technology.

As a result, AMD said, it plans to obtain an arbitrator to force Intel to comply with the 1982 agreement.

Under the agreement, AMD and Intel exchanged rights to manufacture each other's products. Intel, however, has refused to transfer its products and to select AMD products it would want in exchange, according to W. J. Sanders III, AMD's chairman and chief executive officer.

"Intel has shirked its obligations to AMD," Sanders said. "AMD has proceeded in good faith at all times under the technology exchange agreement." An Intel spokesman said the company would not comment on the matter.

AMD acted as a second source for Intel's IAPX86 microprocessor products and contributed to the ultimate success of those products, Sanders said. "Intel derived immediate and substantial benefits in the early stages of this agreement. They continue to enjoy those benefits in large measure because of AMD's significant contributions to the success of the IAPX86 family," he added.

In addition, Sanders said, Intel is still obligated to allow AMD to act as a second source for the 8087 and 80386 microprocessor technologies, although Intel is currently able to satisfy the demand for those products on its own.

"Moreover, the market will require a reliable second source for these devices if they are ever to achieve their full potential," Sanders said. "We have met all of the conditions that entitle us to the rights to manufacture these devices."

In response to AMD's demand for arbitration, Intel told AMD it intends to terminate its technology agreement as of April 1, 1988. AMD, however, said royalty payments and existing licenses for products already exchanged under the agreement will continue after the agreement is terminated.

Separately, AMD reported a fourth-quarter net loss of $3.3 million, or 6 cents per share, compared with a year-earlier quarterly loss of $11.3 million, or 20 cents per share.

For the fiscal year ended March 29, AMD reported sales of $632 million, up 10% from $576.1 million the year before. Net loss was $95.9 million, or $1.66 per share, compared with $36.6 million, or 65 cents per share, in fiscal 1986. The loss included a one-time charge of $19.9 million taken during the second quarter for consolidating operations.

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Rankings

CONTINUED FROM PAGE 103

er than all but three of the first 170 firms on the list.

Unisys Corp. may be touting the power of 2, but it remains No. 3 in the computer industry. The Sperry Corp.-Burroughs Corp. hookup is two slots behind DEC in the *Fortune* 500 at No. 46.

Rounding out the information industry's entrants on the *Fortune* 100 are Hewlett-Packard Co., Honeywell, Inc. (in its final year as a computer vendor), Motorola, Inc. and NCR Corp. NCR had the most impressive growth of the lot, moving up from No. 89 to No. 75.

Each year, one computer industry vendor seems to burst onto the *Fortune* 500 with a huge splash. Compaq Computer Corp. and Apple Computer, Inc. had their years; in 1986 it was Cray Research, Inc.

Checking in at No. 421, the supercomputer pioneer also led the entire field in return on sales (20.9%), placed second in 10-year average return to investors and sixth in return on assets. Cray's 1986 profit of $124.8 million was the 500's 127th-best performance, trailing only IBM, DEC, HP, NCR and Apple in the industry.

Another notable newcomer to the *Fortune* 500, at No. 481, was Seagate Technology, Inc., one of the great turnaround stories of 1986. Seagate's sales grew 114% in its last fiscal year, the sixth best growth of any *Fortune* 500 company. Its return to investors, 164%, was second best. Interestingly, another turn-around company, Storage Technology Corp., had the sixth best return to investors on the list — an even 100%.

Seagate, with a 166% gain, also made the *Forbes* list of the top five market value increases. The firm, along with fellow *Fortune* 500 newcomers Xidex Corp. (No. 493) and Intergraph Corp. (No. 417), is living proof of the industry's vitality. The elite 500, however, do not lack for signs of malaise in several segments of the computer industry.

Of the list's 71 firms that lost money in 1986, 11 were computer related, starting with Honeywell's $398 million deficit, which ranked fifth behind four industrial giants. The rest of the red-ink lot in descending order are: Control Data Corp., Intel Corp., Gould, Inc., National Semiconductor Corp., Unisys, Advanced Micro Devices, Inc., Data General Corp., Varian Associates, Inc., Zenith Electronics Corp. and Computervision Corp.

Computers also siphoned considerable profits away from AT&T, whose decline in net income (91%) was the fifth largest of *Fortune* 500 firms that made money. Ma Bell finished as No. 7 in revenue but only No. 115 in earnings. And troubled Datapoint Corp., No. 458 one year ago, dropped off the list this year.

Wilder is *Computerworld's* senior editor, computer industry.

Tandon buys Winchester drive maker

BY JAMES A. MARTIN
CW STAFF

CHATSWORTH, Calif. — Tandon Corp. said last week that it has entered into a definitive agreement to acquire Winchester disk drive manufacturer Atasi Corp. for about $5 million in stock.

Separately, Tandon reported its best financial performance in nearly three years. For the second quarter ended March 29, Tandon's profits jumped 164% to $5.1 million, or 10 cents per share. Revenue increased 38% to $80.4 million.

With the Atasi acquisition, Tandon said it is seeking to expand the capacity of its rigid disk drives. Tandon's line of Winchester disk drives ranges up to 50M bytes of storage, while Atasi's storage capacity offers up to 170M bytes.

'Adds to Tandon's resources'

"The acquisition will immediately add to Tandon's own resources an advanced-patented technology, a specialized engineering team and a quality high-capacity product line that would take us considerable time and expense to develop on our own," Sirjang (Jugi) Tandon, chairman and chief executive officer, said in a statement.

The agreement calls for Tandon to issue 400,000 shares of stock in exchange for Atasi's common stock, which is privately held. Tandon's stock has been trading at approximately $5.25 per share.

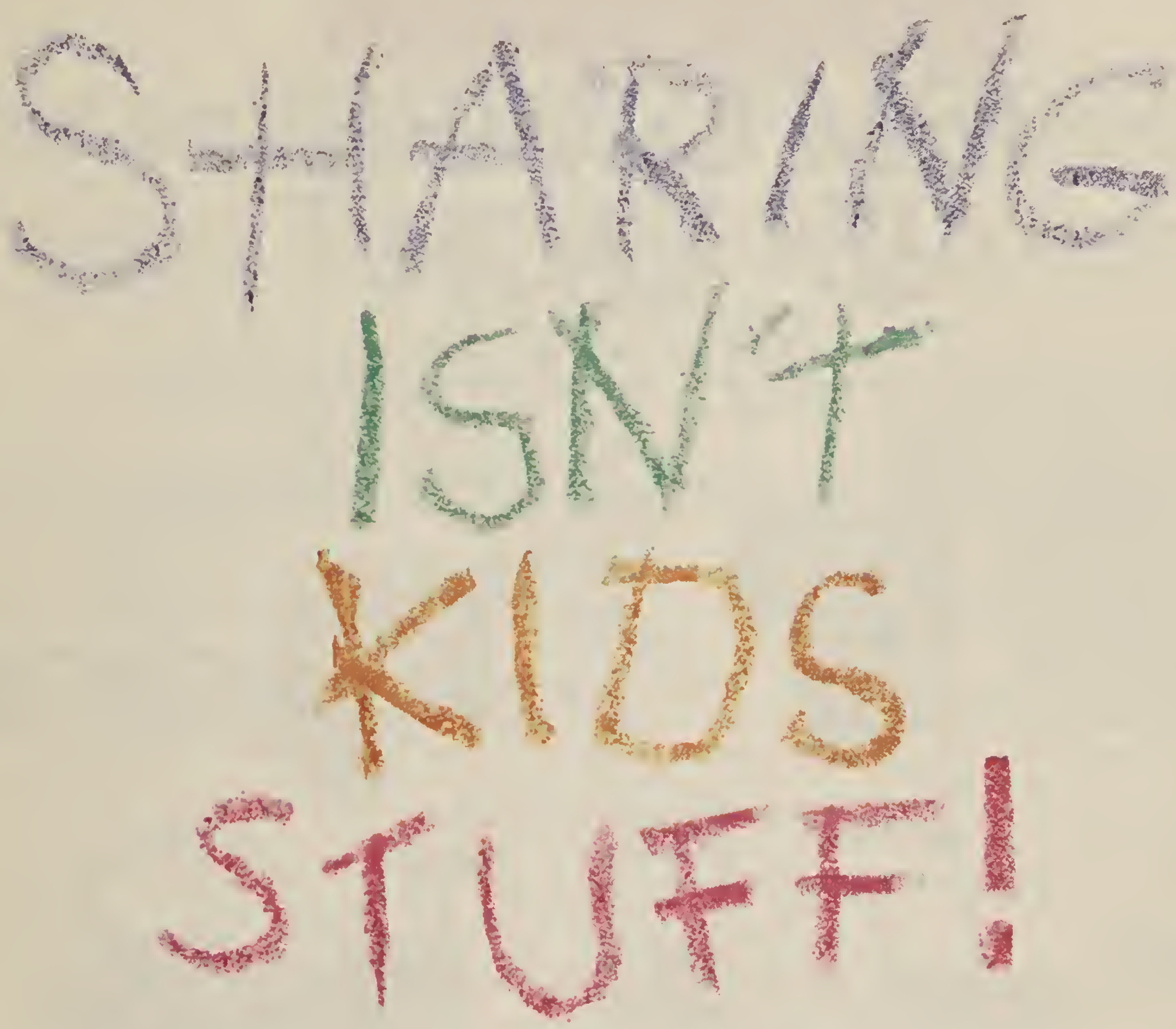
In addition, Tandon will offer approximately $2.75 million in current Tandon stock to Atasi shareholders.

Wholly owned subsidiary

San Jose, Calif.-based Atasi is to be operated as a wholly owned subsidiary, with its engineering and research and development consolidated with Tandon. Production of Atasi's 5¼-in. hard disk drives is scheduled to continue in San Jose only until the firm is transferred to Tandon's Singapore facility.

Several Atasi drives are already used in Tandon's line of IBM Personal Computer AT-compatibles, such as Tandon's PCA 70 with a 70M-byte hard disk.

Atasi began operations in 1981 and has 65 employees.



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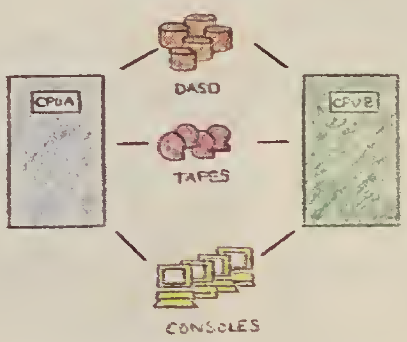

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Miller leaves DG to take over MIPS Computer

Supplier of RISC add-on products names former DG vice-president chairman, CEO

BY JAMES A. MARTIN
CW STAFF

SUNNYVALE, Calif. — Robert C. Miller, formerly senior vice-president of Data General Corp.'s Information Systems Group, has been named president, chief executive officer and chairman of the board of MIPS Computer Systems, Inc., an OEM supplier of reduced instruction set computing (RISC) add-on products.

Miller said that his departure from DG had nothing to do with the fact that the Westboro, Mass.-based minicomputer vendor has been suffering in the marketplace.

"My primary reason for taking this job was the opportunity I saw in MIPS," he added. "I was happy at DG and I'm still confident they will be a successful company."

DG chairman to fill in

DG Chairman Edson de Castro will take over Miller's management responsibilities on an interim basis until a replacement is hired, according to a DG statement.

At MIPS Computer Systems, Miller is replacing Vaemond H. Crane, who announced his resignation in January and departed in March.

Crane left due to a difference of opinion with MIPS management, a company spokesman said.

Miller joined DG from IBM in 1981 as senior vice-president of technology and later became senior vice-president for the Information Systems Group.

In that position, Miller was responsible for all DG systems as well as sales development and marketing for the government market.

'Substantial asset'

"His breadth of technological expertise, market knowledge and managerial skills will be a substantial asset to MIPS in meeting its objectives to become the dominant supplier of RISC-based products," said Don Muller, MIPS's acting chairman of the board.

MIPS focuses on RISC microprocessors that are supplied to OEMs such as Prime Computer, Inc. and Silicon Graphics, Inc.

The RISC supplier employs 135 people.

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BPI sold

CONTINUED FROM PAGE 103

for $295 per module.

Austin, Texas-based BPI will report a loss of about $2.1 million on revenue of between $8.5 million and $9 million for the fiscal year ended March 31, according to Anthony Wang, Computer Associates' president and chief financial officer. In the past year, BPI has failed to duplicate its early success in OEM contracts to write software for systems vendors such as IBM, which markets BPI-developed accounting software as the IBM Business Assistant series.

"They have had lackluster performance because of the OEM market drying up," Wang said. "Three or four years ago, a lot of hardware manufacturers were interested in micro accounting software."

Despite notable failures in the market such as Management Science America, Inc.'s ill-fated acquisition of Peachtree Software, Inc., one analyst said micro accounting software could be a money maker for Computer Associates.

"There is no standard established in that market yet, no Lotus Development Corp. 1-2-3," said Charles Taylor Jr. of Prudential-Bache Securities, Inc. "Computer Associates has taken the first steps to establishing one, and now they will be twice the size of their nearest competitor in the market."

By consolidating BPI's operations with its own micro division in San Jose, Calif., Computer Associates can probably bring BPI to the break-even point fairly quickly, Taylor said. He noted that Computer Associates' certified dealer and installer programs should give BPI the distribution channels and end-user market presence it never successfully achieved on its own. "People may look at BPI's recent track record and turn their nose up at the deal, but it's a very good acquisition," Taylor said.

Alex Brown & Sons, Inc. analyst Kenneth Burke also said the acquisition was a positive move for Computer Associates, but noted that BPI will only be a tiny piece of the largest independent software vendor. "It's hard to make very much of it, given the relative size of the two companies," Burke stated.

Wang said no decisions have been made yet regarding keeping BPI's Austin headquarters, retaining its 130 employees or retaining the BPI name on its product line. BPI's board has approved the acquisition and is expected to recommend shareholder approval.

Industry

CONTINUED FROM PAGE 103

penses but plan to produce increased profits to make up the difference.

Wang said he expects a solid profit for the fourth quarter and expects the firm to show a 10% after-tax profit margin by fiscal 1990.

NCR. Analysts said the Dayton, Ohio-based vendor's earnings were also better than expected.

"NCR was probably helped from the decline in the dollar, but this is much better than you can account for just from the dollar," said Donald Young, an analyst with Sanford C. Bernstein & Co. "NCR is really out-performing the industry." Young said his firm is raising its 1987 per-share profit estimate for NCR based on a strong start for the year.

For the quarter, NCR posted income of $61.5 million, or 65 cents per share, on sales of $1.1 billion. For the like quarter in 1986, earnings were $50.2 million, or 51 cents per share, on sales of $960.8 million.

"This marks NCR's sixth consecutive quarter of double-digit revenue growth," said Chairman and President Charles Exley Jr. "Revenue growth was particularly strong in our Europe and Pacific marketing groups, while growth in the U.S. improved." He added that the U.S. dollar value of worldwide incoming orders posted a "very substantial gain over the first quarter of 1986."

Apple. In Cupertino, Calif., Apple last week announced that its sales climbed to $575.3 million for its second quarter ended March 27, compared with sales of $408.9 million a year earlier. Earnings were $33.9 million, or 51 cents per share, compared with earnings of $31.8 million, or 50 cents per share, last year.

The company said its income growth was lower than the revenue increase because of an increase in research and development spending to fund new product development.

"This was due to be the last tough comparison for the company," said analyst Walter Winnitzki of L. F. Rothschild, Unterberg Towbin. "After this period, earnings comparisons should be up. These results should bode well for that."

Honeywell, Inc. Edson Spencer, Chairman and Chief Executive Officer at Honeywell, attributed his company's increase in earnings to cost-cutting efforts initiated in 1986, including the spin-off of its information systems business to Honeywell Bull, Inc.

In its first quarter as a non-computer company, the Minneapolis-based firm had earnings of $43.7 million, or 96 cents per share, compared with $36.4 million, or 79 cents per share, a year ago. Sales for the period were $1.5 billion, up 29% from sales of $1.15 billion in the like quarter of 1986.

Analyst Stephen Dube of Shearson Lehman Brothers, Inc. said, "The results were quite strong, due largely to the strong Aerospace and Defense Division." The results do not include figures for Honeywell's computer business although the Honeywell Bull joint venture was not formalized until the end of the quarter.

Automatic Data Processing, Inc. Roseland, N.J.-based ADP announced an earnings increase of 23% for its third quarter ended March 31.

Sales for the independent computing services firm for the period were $373.7 million, up 15% from the prior year's sales of $324:3 million. Earnings were $39.3 million, or 52 cents per share. In the like quarter last year, earnings were $31.9 million, or 43 cents per share.

Senior writer Ninamary Buba Maginnis contributed to this story.

Amdahl takes CEO post at power vendor

BY JAMES A. MARTIN
CW STAFF

SAN JOSE, Calif. — Gene Amdahl, the founder of Amdahl Corp., has been elected chief executive officer of Modular Power Corp., an uninterruptible power supply vendor in Silicon Valley.

Modular Power was founded in 1985 to develop what it expects to be the first electronic motor-generator to offer uninterrupted power to mainframe computers. Its first product, Upstar, is to begin shipment this quarter.

Amdahl had been serving as chairman of Modular Power and was elected to be the company's first chief executive officer by its board of directors.

A pioneer of IBM's 370 architecture, Amdahl left the company to found plug-compatible mainframe vendor Amdahl Corp. in 1970.

He left Amdahl in 1979 and in 1980 acted as a co-founder of Trilogy Ltd., which failed in its expensive effort to develop new very large-scale integration technologies.

Amdahl will continue to serve on the board of Trilogy, which is now essentially a research arm of parallel processor vendor Elxsi.

Amdahl said he expects to take "a strong and active role" at Modular Power.

"In the months ahead, we'll give the industry tangible proof that we have met our very ambitious objectives," he said in a statement.

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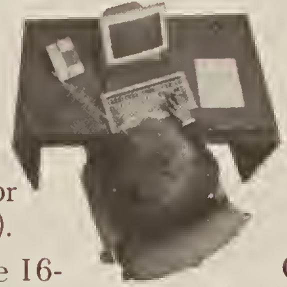

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Healthy economy bolsters MIS

Retailers match consumer spending with computer investments

BY MICHAEL BALL
SPECIAL TO CW

There is a direct relationship between consumer spending and the investment that retailers are willing to make in their MIS operations. Currently, because people are buying retail items at a healthy rate, department store chains are spending more on hardware, software and personnel.

In fact, for the last several years, while times have been good, the corporate face has smiled on MIS in the retail industry.

"Retail is very busy and rapidly changing; and that appeals to many data processing people," says Joel Montgomery, vice-president of human resources for Carter Hawley Hale Stores, Inc. in Los Angeles.

At Lord & Taylor in New York, Ray Brizzi, director of technical services, says his DP department has grown steadily from a staff of five to 13. His current position contrasts with one he held at W. T. Grant and Co. in the 1970s. Brizzi says he was gun-shy of retail after that company folded.

There are many opportunities in retail for MIS professionals, even though the industry is experiencing a similar increase in the number of takeovers and mergers as many other industries.

For example, Lord & Taylor recently became part of the St. Louis-based May Department Store Co. The takeover brought about some changes but was not as traumatic as some acquisitions in other industries, according to Brizzi. Instead of instituting massive DP staff layoffs because of suddenly redundant positions, the new management sees the current staff as indispensable.

The changes that did come were more in style than in substance. Brizzi points out that the additional layer of management means equipment purchases are now approved through St. Louis. Further, in daily operations, New York staff must switch to the May style of data handling and reporting.

Smaller, independent retailers, such as Toys R Us, Inc. based in Rochelle Park, N.J., are also investing in their MIS operations. "In the past four years, Toys R Us has had very low turnover," says DP manager Paul Gallico. Perhaps one of the reasons for the lack of turnover is that Toys R Us "always gives us enough hardware and software resources to do our job right," Gallico says.

> THERE are many opportunities in retail for MIS professionals, even though the industry is experiencing a similar increase in the number of takeovers and mergers as many other industries.

Moving on up

To retain personnel, retailers, regardless of size, try to offer MIS professionals upward mobility within the firm. "Partly because we are so young and still growing, we can honestly promise people that we will promote from within and there is a place to go," Gallico says.

Except for a few peculiarities, the technical expertise retailers demand from MIS employees is similar to that required by other industries. Retailers differ markedly from other industries in their expectations of a DP staff's level of experience.

On the one hand is Los Angeles-based Bullock's, where DP manager Jim Ferry says, "We want to train our people." Bullock's tends to build exclusively from the bottom. "We hire many of our people directly out of college, but we don't always look for a computer degree," Ferry explains.

Bullock's uses its own aptitude test, which Ferry says is a good predictor of DP performance. As a result, the Bullock's MIS department has plucked DP workers from their stores as well as elsewhere in the corporation. Bullock's has turned management trainees into programmers or operations staff.

"We want fast-paced, hard-working people," Ferry says, "and we want somebody who has some experience in retailing. When you train people, they really understand and are interested in your business, and they are loyal."

As part of its training, Bullock's pays for external programs and provides its own in-house.

On the other hand, at Toys R Us, computer skills are the first requirement of a new employee. Then comes attitude, Gallico says.

At Lord & Taylor, Brizzi says his employees work well together and share personality traits. "We demand that they are able to take on different tasks and to handle a lot of things at once," he says.

The attitude is important at Carter Hawley Hale Stores, too, but the emphasis there is external, to the customer. "Most [of our DP] people are originally from nonretailing environments," Montgomery says, "so we want them more aware of and more responsive to customers."

Ball is a free-lance writer based in Boston.

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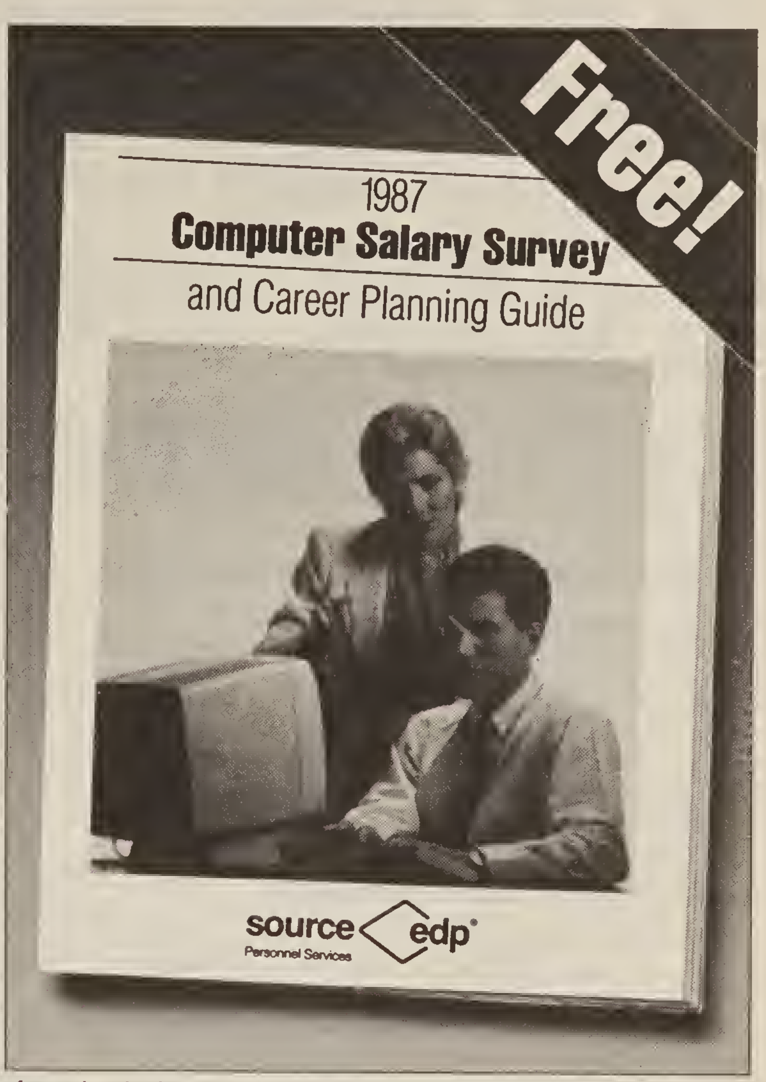

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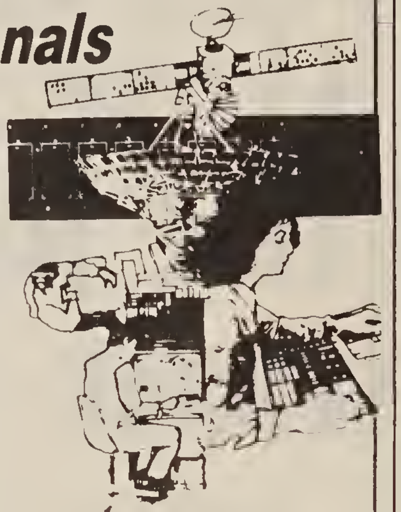

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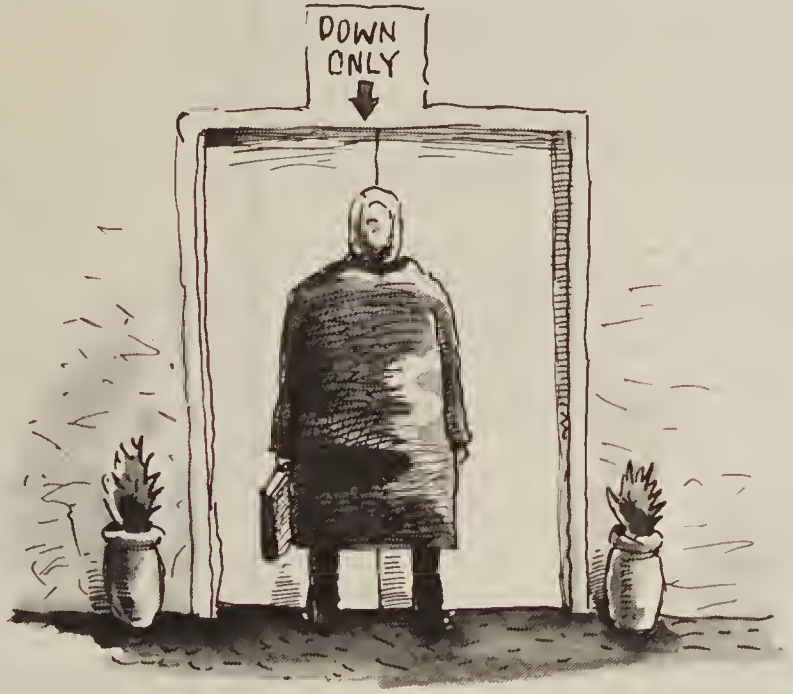

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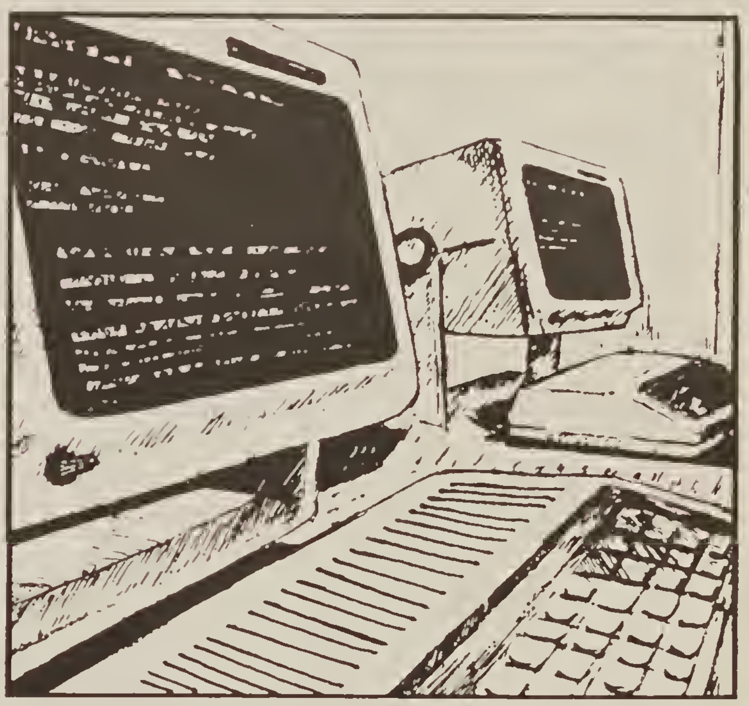

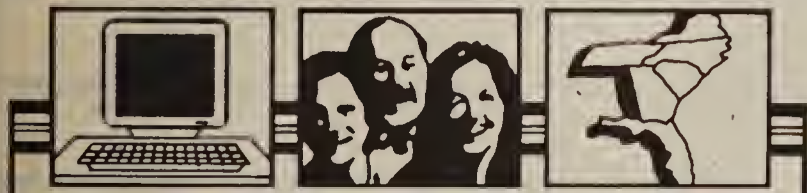

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If you qualify, call Ann Griffiths or write to:

CRA

Computer Resource Assoc., Inc.
1400 Plaza West, Suite 301
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(717) 737-4810

All replies will be held in strictest confidence.

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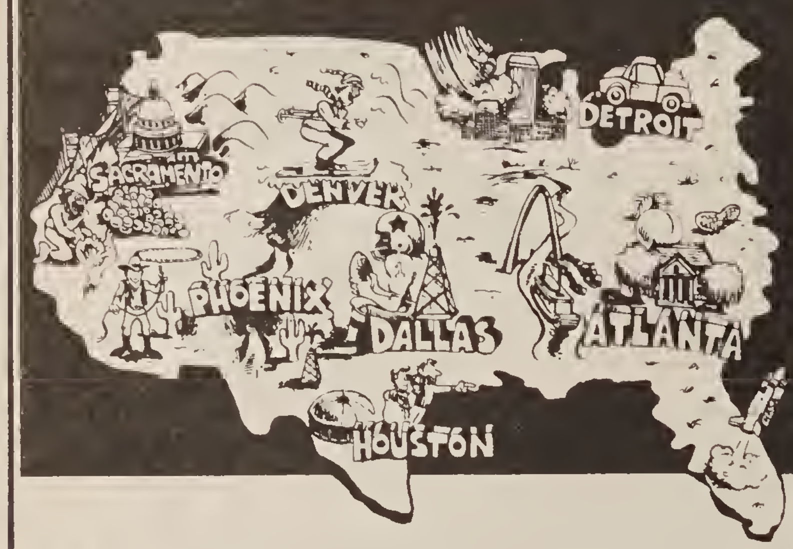

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- Determine hardware and software requirements; direct preparation of systems studies, analyses and proposals for development of computer systems; verify technical specifications. Design and implement systems, supervise EDP staff in installation, maintenance and software design. Monitor and evaluate technical capabilities and performance of EDP staffs Detect, diagnose and correct problem areas Prepare user manuals and upgrade operating efficiency Duties involve use of Burroughs B1900 and B20 micros, COBOL, DMS II and BTOS. BA Degree in Computer Science or Engineering plus 3 years experience as a Systems Analyst required. 40 hours/week. $38K/year. DOT 012167066. Mail resume to NYS Job Service, JO # NY8023357, 97-45 Oueens Boulevard, Rego Park, NY 11374.

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Total Petroleum, Inc., a Denver based integrated oil company with expiration and production operations in the US and Canada and refining or marketing operations in 21 mid-continent states, is seeking an EDP Auditor. Educational requirements include a Bachelors Degree in Accounting 2 or more years EDP Audit or Systems Development experience required. Minimum travel. Along with a competitive salary and opportunity for growth, Total offers a comprehensive fringe benefits package including medical, dental and life insurances, tuition reimbursement and a stock savings plan

Please send your resume with salary requirements to J Jaltuch, P.O. Box 500, Denver, Colorado 80201

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IBM SYSTEM 38 PROGRAMMER/ANALYST

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Lockheed offers an excellent salary and a comprehensive benefit program. For immediate confidential consideration, please forward resume to: LOCKHEED-GEORGIA COMPANY, Professional Employment, Dept. 90-31-432, Marietta, Georgia, 30063.

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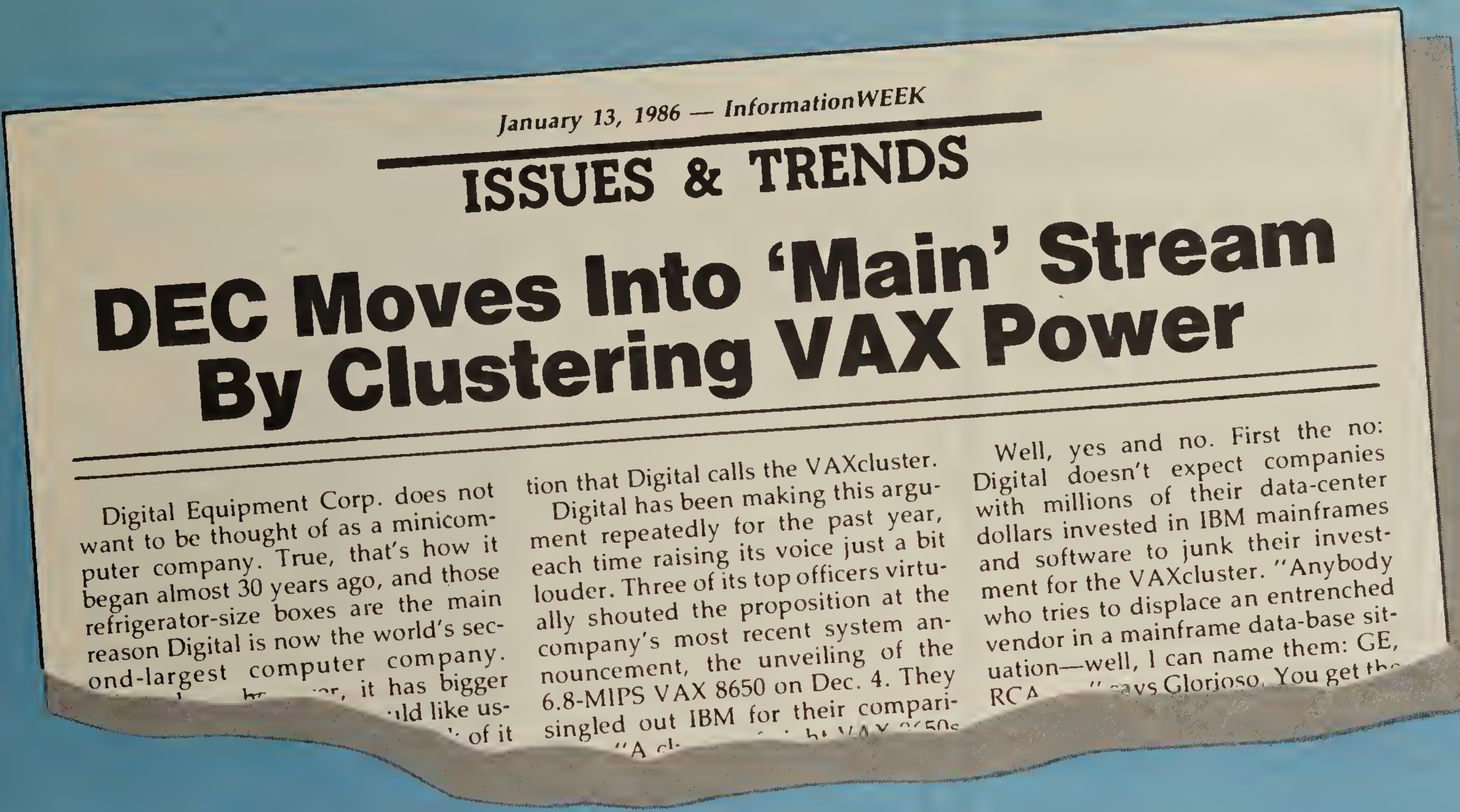

January 13, 1986 — InformationWEEK

ISSUES & TRENDS

DEC Moves Into 'Main' Stream By Clustering VAX Power

Digital Equipment Corp. does not want to be thought of as a minicomputer company. True, that's how it began almost 30 years ago, and those refrigerator-size boxes are the main reason Digital is now the world's second-largest computer company. it has bigger ld like us- of it

tion that Digital calls the VAXcluster.

Digital has been making this argument repeatedly for the past year, each time raising its voice just a bit louder. Three of its top officers virtually shouted the proposition at the company's most recent system announcement, the unveiling of the 6.8-MIPS VAX 8650 on Dec. 4. They singled out IBM for their compari- "A

Well, yes and no. First the no: Digital doesn't expect companies with millions of their data-center dollars invested in IBM mainframes and software to junk their investment for the VAXcluster. "Anybody who tries to displace an entrenched vendor in a mainframe data-base situation—well, I can name them: GE, RCA ..." says Glorioso. You get the

Read all about it.

Everyone sees it now—but Digital saw it first.

The need to make computers work together.

Other computer companies were left standing among their 'stand alones' while Digital was off and running with a promise of full compatibility.

Our unique networking capability has been the cause of much celebration on Wall Street as our stock doubled, split, and jumped—and stories of our tremendous success have hit in almost every major newspaper and magazine in the country.

It seems that interaction—is where the action is these days.

As a matter of fact, the VAXcluster* allows us to move into the data center in a big way. Take several VAXes*—all with the same architecture and the same operating system, and link them to hundreds of terminals over Ethernet—and you have the configuration of the future.

If you have problem-solving and sales skills, industry or vertical market expertise, solid communications skills, and a knowledge of Digital's products—and how to position them competitively —let's talk about making headlines together.

Computer Sales Professionals

You will be involved in presenting our full range of sophisticated systems and designing leading edge answers to a wide variety of customer problems. We expect you to talk solutions with all levels of a customer organization. We require:

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- large account management expertise
- knowledge of computer services, such as timesharing or software

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In this consulting role, industry experts will develop strategies that match Digital's product strategies to the individual needs of customers. This will involve developing architectures around specific application areas. We require:

- a minimum of 15 years proven experience within the finance/banking industry or other vertical industries
- an ability to integrate Digital's products and technology solutions with customer business goals
- knowledge of networking technologies and project management experience desirable

Software Systems Architects

You will design system configurations with specific industry focus. This will involve consulting with customers, designing solutions and providing quality assurance. We require:

- a minimum of 8 years experience with Digital's DNA or related SNA products
- familiarity with VAX/VMS* or similar 32-bit operating system technology
- knowledge of Ethernet/LAN or comparable competitor products

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Candidates should send resumes, including identities of references to:

Professor Daniel Killeen, Chairman
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Request for Proposal No. 1209, due Tuesday, May 5, 1987 at 3:30 p.m. for the acquisition of molecular design software and data libraries to run on a Micro Vax II under VMS 4.4 or greater for the Department of Medicinal Chemistry at the UNIVERSITY OF MISSISSIPPI. No charge.

Request for Proposal No. 1210, due Monday, May 11, 1987 at 3:30 p.m. for the acquisition and implementation of an open systems computer LAN network in a multi-vendor computer environment which allows for electronic communications among differing operating systems, interface of differing technology hardware systems, and the utilization of electronic mail and office automation functions for NORTHEAST MISSISSIPPI JUNIOR COLLEGE. Charge $10.00.

Detailed specifications may be obtained free of charge from the CDPA office or at the specified cost by submitting a written request accompanied by the appropriate payment. **NOTE: Valid forms of payment are corporate check on a Mississippi bank, certified check or POSTAL money order. NO CASH OR OUT-OF-STATE CHECKS.** The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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   - 20 Finance/Insurance/Real Estate
   - 30 Medicine/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50 Business Service (except DP)
   - 60 Government — State/Federal/Local
   - 65 Public Utility/Communications Systems/Transportation
   - 70 Mining/Construction/Petroleum/Refining/Agriculture
   - 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer Service Bureau/Software/Planning/Consulting
   - 90 Computer/Peripheral Dealer/Distributor/Retailer
   - 75 User Other ____________
   - 95 Vendor Other ____________

   (Please specify)

2. **TITLE/FUNCTION** (Circle one)

   IS/MIS/DP MGT
   - 19 Vice President, Asst VP
   - 21 Dir., Mgr., Suprv., IS/MIS/DP Services
   - 22 Dir., Mgr., Suprv., of Operations, Planning Adm Services
   - 23 Dir., Mgr., Suprv., Analyst, of Systems
   - 31 Dir., Mgr., Suprv., of Programming
   - 32 Programmer, Methods Analyst
   - 35 Dir., Mgr., Suprv. OA/WP
   - 38 Data Comm Network/Systems Mgt

   OTHER COMPANY MANAGEMENT
   - 11 President, Owner/Partner, General Mgr
   - 12 Vice President/Asst VP
   - 13 Treasurer, Controller, Financial Officer

   ENGINEERING
   - 41 Engineering Scientific, R & D, Tech Mgt

   SALES
   - 51 Manufacturing Sales Reps Sales/Mktg Mgt

   OTHER PROFESSIONALS
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   - 70 Medical Legal Accounting Mgt
   - 80 Educators, Journalist, Librarians Students
   - 90 Others ____________

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   Types of equipment with which you are personally involved either as a user, vendor, or consultant
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   - B Minicomputers/Small Business Computers
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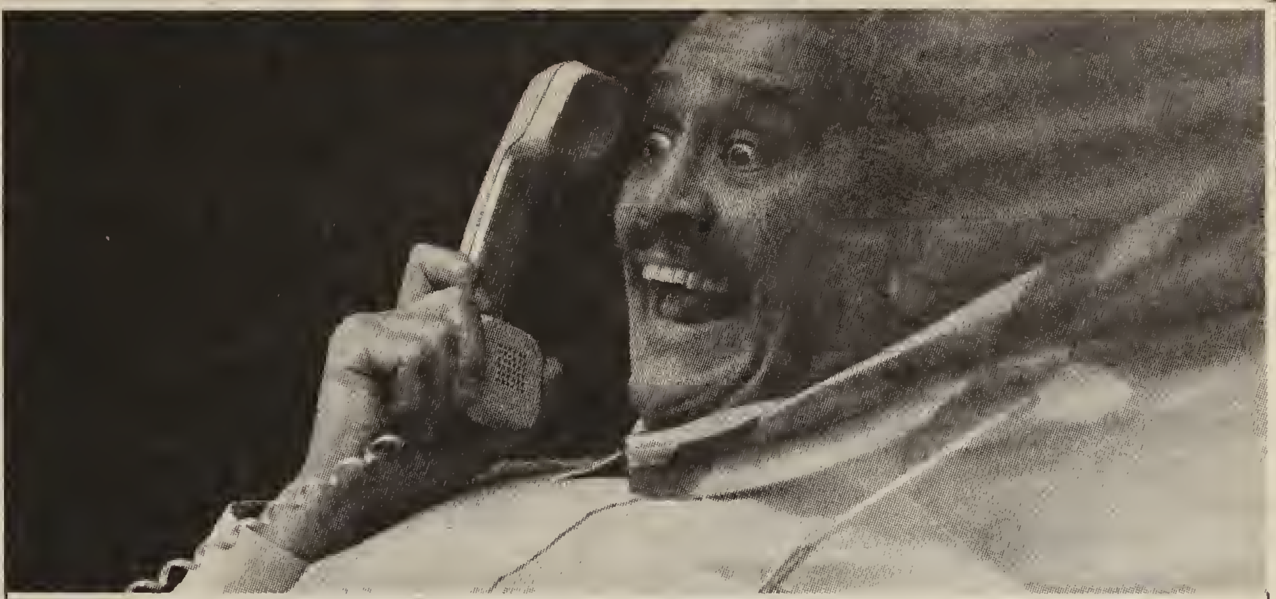

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REQUEST FOR INFORMATION (RFI)

Re: Transit Authority
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The New York City Transit Authority (Authority) is seeking responses to identify vendors interested in designing, developing and implementing TALON. This is to be a large scale, multi-year mainframe computer software applications project to replace the various separate systems (some interconnected) and manual procedures which presently support the Authority's material procurement, multistoreroom receipt and accounts payable, distribution, inventory, parts repair and maintenance functions.

Currently these operations are handled in four major types of computers: IBM 3084, Prime 550, WANG VS300 and several IBM System 38s. In addition, PC applications are used in some departments. The current functionality exceeds 1650 programs, 500 screens, 500 reports, 55,000 daily transactions and 500 terminals. Alternate approaches of new development, revision of the existing systems or a custom redesigned commercial package will be considered. The new system will have to operate in the Authority's COBOL IBM MVS CICS IDMS environment. It will also have to include the latest techniques for efficient data collection.

The Authority intends to establish a "short list" of the most qualified firms from those who respond to this RFI. The firms on the "short list" will be invited to participate in the request for proposals (RFP) phase and be considered for award of any TALON contract. The factors that the Authority will consider in evaluating proposals will include the following: (1) adequacy and completeness of the proposal with regard to the work and all matters called for by the RFP; (2) proposer's prior experience in providing goods and/or services similar to those proposed, (3) proposer's financial resources and stability and professional/business responsibility; (4) proposer's proposed management of the project as evidenced by, for example, the experience of the personnel who will work on the project and the proposed schedule; (5) the extent to which any enhancements which the proposer offers to the work called for by the RFP or the terms and conditions proposed by the Authority are desirable and advantageous to the Authority; and (6) proposed price for the work.

Vendors desiring to be considered must respond to this request by submitting a letter of interest and providing detailed information about their experience in such projects, including project description, size and scope, fee and time duration; numbers and types of computer professionals available and the firm's financial status (include balance sheet or annual report).

Letters of interest and documentation must be received no later than May 8, 1987 at:

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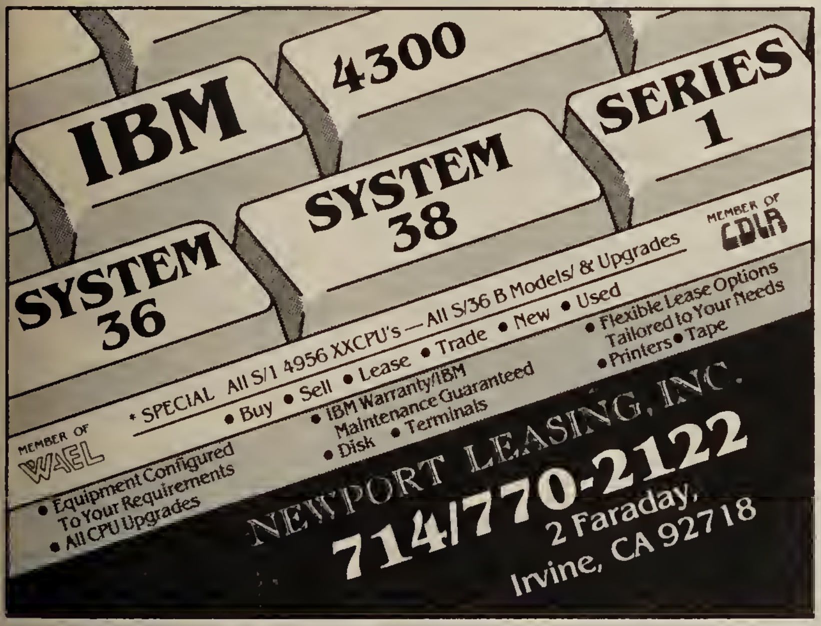

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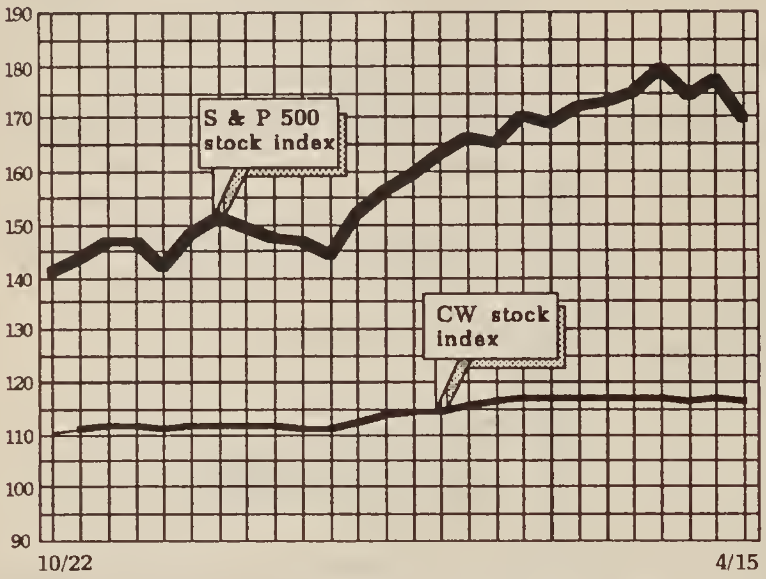

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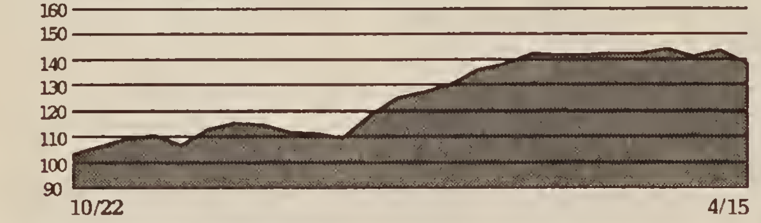

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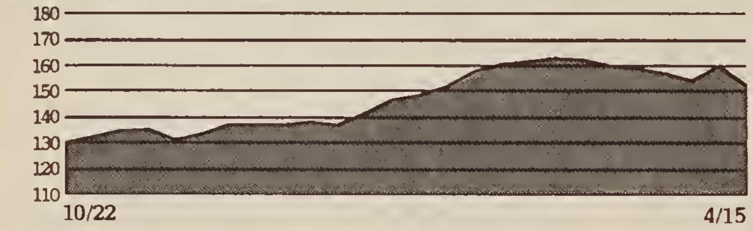

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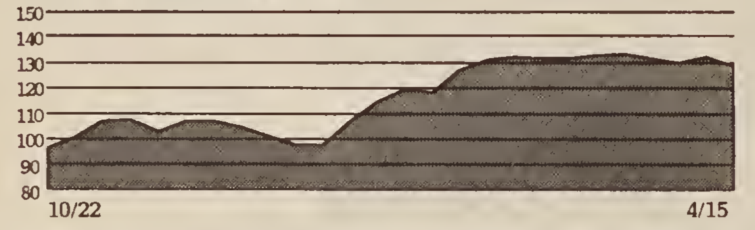

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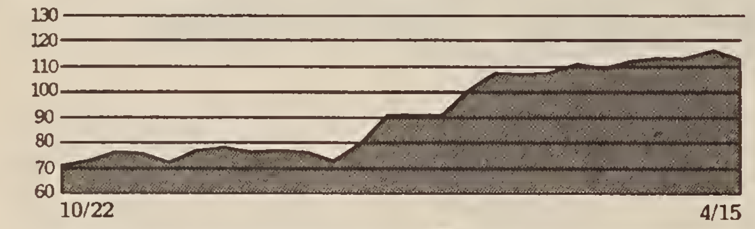

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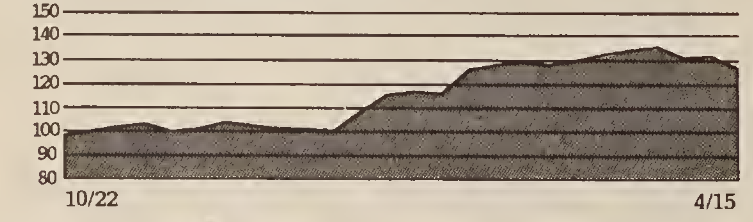

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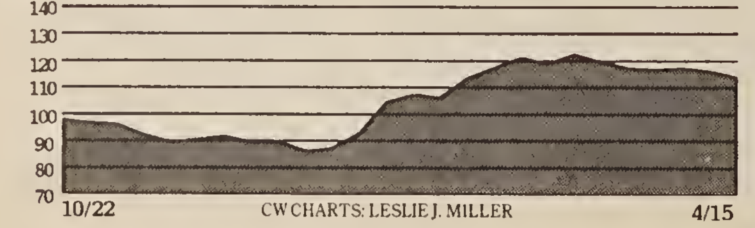

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EXCH		52-WEEK RANGE (1)		PRICE CLOSE APRIL 15 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.25	-0.3	-5.6
O	ALTOS COMPUTER SYS	19	10	12.00	-1.8	-12.7
A	AMOAHL CORP	41	15	37.50	+0.9	+2.4
O	APOLLO COMPUTER INC	23	9	17.50	-1.1	-6.0
O	APPLE COMPUTER INC	73	27	71.00	+2.0	+2.9
N	AT&T	28	22	24.75	+0.6	+2.6
O	C P T CORP	6	3	4.00	-0.1	-3.0
N	COMPAQ COMPUTER CORP	35	12	30.75	-1.6	-5.0
A	COMPUTER CONSOLES INC	12	7	9.38	-0.1	-1.3
O	CONCURRENT COMP CORP	19	11	15.75	-0.5	-3.1
N	CONTROL DATA CORP	33	20	3D.38	-0.9	-2.8
O	CONVERGENT TECH	12	4	6.63	-3.0	-31.2
N	CRAY RESH INC	136	69	127.25	-2.8	-2.1
O	OAISY SYS CORP	15	8	9.75	-0.1	-1.3
N	OATA GEN CORP	45	25	30.38	-1.9	-5.8
N	OATAPOINT CORP	9	4	4.88	-0.4	-7.1
N	OIGITAL EQUIP CORP	173	81	161.25	-4.3	-2.6
N	FLOATING POINT SYS INC	46	11	12.50	-1.0	-7.4
N	GOULO INC	28	15	17.25	+0.4	+2.2
N	HARRIS CDRP	40	27	38.13	-0.4	-1.0
N	HEWLETT PACKARO CO	63	36	53.50	-2.5	-4.5
N	HONEYWELL INC	84	58	74.25	-0.8	-1.0
N	I8M	162	116	150.88	+3.3	+2.2
O	IPL SYS INC	4	2	2.75	-0.3	-8.3
N	ITT CORP	66	44	56.00	-6.0	-9.7
N	M A COM INC	18	12	14.00	-0.6	-4.3
N	MATSUSHITA ELEC INOL LTD	136	77	96.75	-7.8	-7.4
O	MENTOR GRAPHICS CORP	29	11	26.50	-0.4	-1.4
N	N8I INC	14	8	10.25	-1.1	-9.9
N	NCR CORP	70	42	66.75	-0.1	-0.2
N	PRIME COMPUTER INC	24	16	23.38	+2.6	+12.7
O	STRATUS COMPUTER	38	18	35.25	+0.0	+0.0
O	SYMBOLICS INC	15	4	5.13	-0.3	-4.7
O	TANDEM COMPUTERS INC	75	27	73.75	+0.0	+0.0
N	TANOY CORP	56	31	45.25	-4.3	-8.6
N	TEXAS INSTRS INC	201	103	195.25	-0.9	-0.4
A	ULTIMATE CORP	35	13	20.00	-1.8	-8.0
N	UNISYS CORP	113	58	102.88	-0.8	-0.7
A	WANG LABS INC - B	20	11	16.00	+0.9	+5.8
A	WANG LABS INC - C	20	11	15.13	-0.2	-1.2
N	XEROX CORP	78	49	73.38	-3.1	-4.1

Supplies & Accessories

EXCH		52-WEEK RANGE (1)		PRICE CLOSE APRIL 15 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER 8USINESS PROOS	37	23	29.63	-0.1	-0.4
N	8ARRY WRIGHT CORP	24	14	18.25	-0.6	-3.3
A	OUPLEX PROOS INC	23	18	20.00	-1.0	-4.8
N	ENNIS 8USINESS FORMS INC	23	14	20.50	-1.8	-7.9
N	3M CD	140	98	126.50	-9.4	-6.9
N	MOORE LTD	28	20	24.75	-1.9	-7.0
O	STANOARD REGISTER CO	53	32	47.00	+0.5	+1.1
N	WALLACE COMPUTER SVCS	50	37	45.00	-3.4	-7.0

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE APRIL 15 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	AOVANCEO COMP TECH	7	3	4.50	-0.1	-2.7
N	AOVANCEO SYS INC	22	12	20.13	-0.9	-4.2
N	AGS COMPUTERS INC	40	17	34.75	-1.3	-3.5
O	AMERICAN MGMT SYS INC	36	13	31.50	-3.3	-9.4
O	AMERICAN SOFTWARE INC	22	6	19.00	-1.8	-8.4
N	ANACOMP INC	8	3	7.38	-0.3	-3.3
O	ANALYSTS INTL CORP	11	4	9.75	+0.3	+2.6
O	ASHTON TATE	30	10	24.25	-0.8	-3.0
O	ASK COMPUTER SYS INC	17	9	15.00	+0.4	+2.6
O	ASTRADYNE COMP IND	3	1	1.25	-0.2	-11.2
N	AUTOMATIC OATA PROC	51	29	45.50	-4.5	-9.0
O	BOOLE & BAB8AGE INC	11	4	9.25	+0.3	+2.8
N	COMPUTER ASSOC INTL INC	48	20	43.13	-2.9	-6.3
O	COMPUTER HORIZONS CORP	15	10	13.00	-D.4	-2.8
O	COMPUTER NETWORK TECH	10	4	4.88	-0.2	-3.7
N	COMPUTER SCIENCES CDRP	61	30	57.75	+0.8	+1.3
N	COMPUTER TASK GROUP INC	19	11	15.00	+1.5	+11.1
O	COMSHARE INC	18	11	16.25	+0.0	+0.0
N	CULLINET SOFTWARE INC	16	6	10.63	+D.D	+0.0
O	CYCARE SYS INC	17	7	8.88	-0.8	-7.8
O	OUQUESNE SYS INC	33	12	30.00	+0.0	+0.0
N	GENERAL ELEC CO	113	71	105.50	-3.5	-3.2
N	GENERAL MTRS CORP (CLASS E)	50	24	36.75	-2.1	-5.5
O	HOGAN SYS INC	17	8	15.25	-0.1	-0.8
O	INFORMATION SCIENCES INC	4	1	1.25	+0.3	+25.0
O	INFOTRON SYS CORP	17	7	9.00	+0.0	+0.0
O	KEANE INC	16	5	8.25	+0.1	+1.5
N	LOGICON INC	38	22	25.13	-2.8	-9.9
O	LOTUS OEV CORP	28	9	26.00	-D.3	-1.0
O	MANAGEMENT SCI AMER	21	12	15.75	-1.0	-6.0
O	MCI COMM CORP	11	5	6.63	-0.4	-5.4
O	MICOM SYS INC	18	10	14.63	-1.1	-7.1
O	MICRO PRO INTL CORP	6	2	4.88	-0.1	-1.3
N	MICROSOFT CORP	100	26	96.00	-0.8	-0.8
O	NATIONAL OATA CORP	27	16	23.50	-0.3	-1.1
O	ON LINE SOFTWARE INT	24	10	22.50	+0.0	+0.0
O	ORACLE SYS CORP	29	7	23.25	-0.5	-2.1
N	PANSDPHIC SYS INC	21	12	19.13	+0.1	+0.7
O	POLICY MGMT SYS CORP	30	15	27.50	-1.3	-4.3
O	PROGRAMMING & SYS INC	13	8	10.50	-0.3	-2.3
O	REYNOLOS & REYNOLOS CO	42	27	33.50	-2.0	-5.6
O	SCIENTIFIC COMPUTERS INC	8	4	7.75	-0.1	-1.6
O	SEI CORP	31	15	26.25	-3.5	-11.8
O	SHARED MEO SYS CORP	53	29	29.63	-1.3	-4.0
O	SOFTWARE AG SYSTEMS INC	22	10	12.63	-0.4	-2.9
O	SOFTWARE PU8G CORP	16	5	14.00	-1.1	-7.4
A	STERLING SOFTWARE INC	21	10	10.88	-0.5	-4.4
N	SUNGUARD OATA SYSTEMS	20	10	17.75	-0.8	-4.1
N	UCCEL CORP	36	18	30.63	-2.8	-8.2
N	URS CORP	21	13	19.13	-1.4	-6.7
O	VM SOFTWARE INC	45	15	40.00	-2.1	-5.0

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE APRIL 15 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCEO MICRO OEV	32	13	20.38	+0.3	+1.2
N	ANALOG OEVICES INC	25	14	20.50	-0.3	-1.2
O	ANALOGIC CORP	14	10	12.38	+0.1	+1.0
N	APPLIEO MAGNETICS CORP	36	13	31.88	-1.6	-4.9
O	AVANTEK INC	23	14	15.00	-0.6	-4.0
O	HADCO CORP	7	3	5.50	-0.6	-10.2
O	INTEL CORP	46	16	41.50	-2.3	-5.1
O	MICRO MASK INC	7	2	5.88	-0.5	-7.8
N	MOTOROLA INC	60	34	54.50	-3.1	-5.4
N	NATIONAL SEMICONDUCTOR	17	8	14.5D	-0.1	-0.9
N	TERAOYNE INC	30	16	23.00	-0.5	-2.1

EXCH: N = NEW YORK; A = AMERICAN; P = PACIFIC; B = BOSTON;
L = NATIONAL; M = MIOWEST; O = OVER-THE-COUNTER; S = SPLIT

Peripherals & Subsystems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE APRIL 15 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	6.75	-0.5	-6.9
A	ANDERSON JACO8SON INC	4	1	2.50	+0.3	+11.1
O	AST RESH INC	23	11	16.50	-0.8	-4.3
O	AUTOTROL CORP	10	5	8.50	+0.8	+9.7
O	AVANT GAROE COMPUTING	7	3	3.75	+0.0	+0.0
O	8ANCTEC INC	14	6	13.50	-0.3	-1.8
N	BOLT 8ERANEK & NEWMAN	60	37	48.00	-2.0	-4.0
A	CETEC CORP	9	5	5.63	-0.3	-4.3
A	COGNITRONICS CORP	6	2	3.25	+0.0	+0.0
N	COMPUGRAPHIC CORP	24	16	21.25	-0.4	-1.7
N	COMPUTERVISION CORP	23	10	18.00	-0.6	-3.4
N	CONRAC CORP	30	12	29.13	-D.5	-1.7
A	OATAPROOUCTS CORP	18	11	12.13	-0.5	-4.0
A	DATARAM CORP	18	7	7.75	+0.0	+0.0
O	DATA SWITCH CORP	9	5	6.00	-0.4	-5.9
O	OATUM INC	7	4	5.50	-0.4	-6.4
N	OECISION INOS CORP	15	7	7.38	-1.0	-11.9
O	ENDATA INC	9	5	8.38	-0.1	-1.5
O	EMC CORP	34	11	24.25	+0.3	+1.0
O	EVANS & SUTHERLANO	40	20	32.00	-2.8	-7.9
N	FLOATING POINT SYS INC	46	11	12.50	-1.0	-7.4
O	GANOALF TECHNOLOGIES	11	5	9.75	-0.4	-3.7
N	GENERAL OATACOMM INO	15	8	11.50	+0.1	+1.1
O	ICOT CORP	13	6	5.63	-0.4	-6.3
O	INFORMATION INTL INC	18	13	14.75	+0.8	+5.4
O	INTERLEAF INC	16	8	14.25	-1.3	-8.1
O	MEGAOATA CORP	7	2	5.13	-0.4	-6.8
A	MSI OATA CORP	17	10	15.75	+0.0	+0.0
N	NASHUA CORP	31	21	28.50	-0.9	-3.0
O	NETWORK SYS CORP	19	11	14.25	-0.1	-0.9
N	NORTH AMERN PHILIPS CORP	47	35	39.38	-0.9	-2.2
N	NORTHERN TELECOM LTO	46	27	43.00	-1.9	-4.2
O	NOVELL INC	26	8	23.25	-26.3	-53.0
N	PARAOYNE CORP	11	4	6.00	+0.0	+0.0
A	PENRIL CORP	8	4	5.25	-0.3	-4.5
N	PLESSEY PLC	41	24	37.25	-0.8	-2.0
O	PRINTRONIX INC	14	10	11.13	+0.1	+1.1
N	QMS INC	18	11	12.88	-0.9	-6.4
O	RAMTEK CORP	7	4	4.75	-0.1	-2.6
N	RECOGNITION EQUIP INC	27	10	20.00	-1.4	-6.4
O	SCAN TRON CORP	19	11	11.75	-1.3	-9.6
N	SCIENTIFIC ATLANTA INC	18	9	16.75	-0.3	-1.5
O	SEAGATE TECHNOLOGY	42	10	34.50	-0.5	-1.4
N	STORAGE TECHNOLOGY	5	2	4.00	-0.1	-3.0
O	SUN MICROSYSTEM INC	35	11	29.50	-2.3	-7.1
A	T-BAR INC	8	5	7.88	+0.0	+0.0
A	TA8 PROOS CO	21	12	18.50	-1.8	-8.6
O	TANOON CORP	8	2	5.50	+0.3	+4.8
A	TEC INC	6	3	3.25	-0.1	-3.7
N	TEKTRONIX INC	43	27	34.50	-0.8	-2.1
O	TELEVIOEO SYS INC	4	2	3.00	-0.1	-4.0
N	TELEX CORP	102	52	75.75	-6.8	-8.2
N	TIMEPLEX INC	41	14	33.63	-1.0	-2.9
N	TITAN CORP	11	6	7.00	-0.3	-3.4
O	WYSE TECH	30	13	23.88	-0.6	-2.6

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE APRIL 15 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	30	15	29.50	+1.8	+6.3
N	CONTINENTAL INFO SYS	14	7	12.00	-0.5	-4.0
O	FINALCO GROUP INC	5	2	2.88	+0.0	+0.0
O	PHOENIX AMERN INC	8	3	5.25	-0.5	-8.7
O	SELECTERM INC	12	5	4.75	-0.3	-5.0
N	U.S. LEASING	52	38	49.13	-1.3	-2.5

Bucking the dip

IBM, NCR lead computer-stock drive in face of Dow Jones drop

Despite a combined drop of 86 points in the Dow Jones Industrial Average in the first two trading days last week, computer stocks, fueled by better-than-expected first-quarter financial results, had an excellent week.

Exceeding analyst expectations and hinting at promising signs for the year, IBM jumped 5 points to close Thursday at 150. Wang Laboratories, Inc., reporting a quarterly profit, climbed 1 point to 15⅞. NCR Corp. rose four points to 69¼. Prime Computer, Inc. was up 2½ points to a year-long high of 24⅜.

Two successful systems vendors went against the trend, possibly indicating that the run-up in their stocks in recent weeks may have peaked. Despite reporting strong quarters, Digital Equipment Corp. plunged 9⅛ points in four days to 157, and Tandem Computers, Inc. fell 3⅝ points to 67½.

Microcomputer stocks were generally up for the week. The meteoric performance of Microsoft Corp. showed no signs of abating, as the stock gained 2⅞ to 98½. Apple Computer, Inc. rose 1¼ points to 71½. But Lotus Development Corp. just hovered near its 52-week high, losing ¼-point to 27.

CLINTON WILDER

IBM, industry clouds breaking

BY CLINTON WILDER
CW STAFF

Last week's IBM first-quarter financial report showed the first glimmering of an upturn in more than a year, sparking cautious optimism for the computer industry's prospects for this year.

Although IBM reported a 23% decline in profits on revenue that grew 5.5% from the previous year's levels, its performance did surpass pessimistic analyst expectations. The company showed notable mainframe sales momentum in March and a surprising volume in Personal Computer sales throughout the quarter.

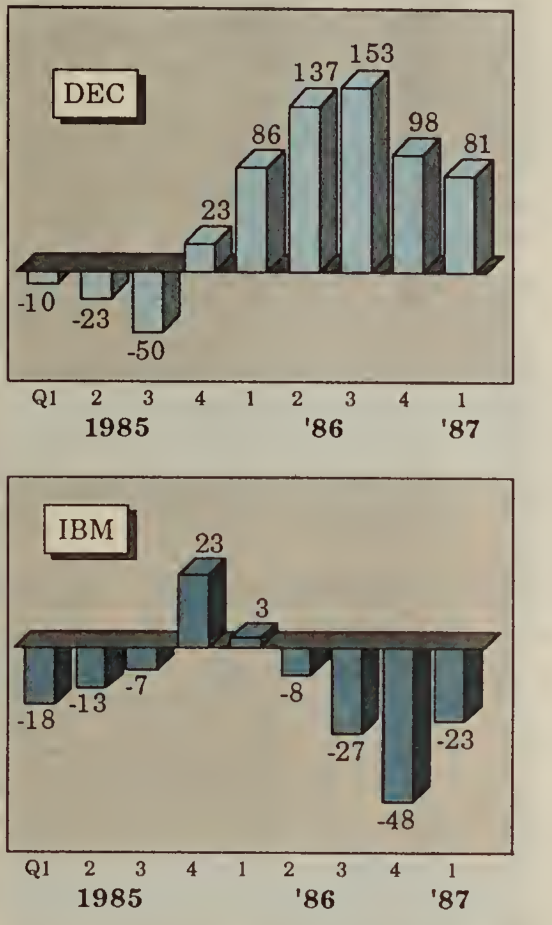
Other leading vendors reported generally strong results, fueling an increasingly positive outlook for U.S. capital spending on computer gear. Digital Equipment Corp. continued its enviable winning streak, racking up 81% profit growth on operating margins that increased for the eighth continuous quarter to 15.2%. NCR Corp., Tandem Computers, Inc., Wang Laboratories, Inc. and Apple Computer, Inc. all reported better-than-expected results (see story page 103).

"I think there was pretty definitive evidence of a possible turnaround," said analyst Marc Schulman of Salomon Brothers, Inc. "For the first time in several quarters, [IBM Chairman] John Akers' statement did not use the word 'cautious' but did include the phrase 'encouraging signs.' IBM is still not willing to say it sees an upturn, but laid the groundwork for saying it the next time."

IBM posted earnings of $785 million, or $1.30 per share, well below $1.02 billion, or $1.65 per share, a year earlier but better than analysts' per-share estimates, which ranged as low as $1. Revenue rose to $10.68 billion from $10.13 billion, while pretax margins fell to 12.5% from 18.1% a year earlier.

Track records

Percentage gain/decline in DEC and IBM profits in comparison to year-earlier quarters



CW CHART: SUSAN ALDAM

At the high end, IBM reported strong mainframe momentum at the end of the quarter, but analysts were mixed on continued prospects. Nonetheless, a predicted pickup in U.S. corporate-capital spending should boost IBM as well as the industry. Capital equipment spending will increase at an average annual rate of 8.8% in the last three quarters, compared with just 4.2% in 1986, according to Data Resources, Inc., a Lexington, Mass., economic forecast firm.

"U.S. corporations have been revising their capital budgets upward," said David Wyss, Data Resources' senior vice-president. "They are optimistic that the economy will overcome the problems caused by tax reform and that export volumes will rise."

Spending for micros fueled IBM's best-ever first quarter for PC sales. "I can't remember a period before a major new product cycle where there was less of an impact on demand for the older products," Schulman said. "Anticipation of the Personal System/2 clearly did not hurt demand for existing PCs."

IBM's first quarter was also aided by a lower corporate tax rate and the drop of the U.S. dollar. A spokesman said favorable currency comparisons added $680 million to IBM's revenue and $95 million to its earnings.

IBM's hardware sales increased 6.5% in the quarter, and income from rentals dropped 25% from the previous year's level.

DEC reported third-quarter earnings of $307.6 million, or $2.29 per share, up from $170.3 million, or $1.32 per share, a year earlier. Revenue grew 25% to $2.41 billion from $1.93 billion in the third quarter of fiscal 1986. DEC pointed to continued productivity improvements, a doubling of its market share in the financial services business and market acceptance of the low-end Microvax 2000 and Vaxstation 2000 as reasons for another stellar quarter.

"I think the IBM 9370 has stemmed the flow to DEC a little bit, but not that much," said analyst Shao Wang of Smith Barney, Harris Upham & Co.

Apollo

FROM PAGE 1

dors' systems on Ethernet. Full Ethernet support "allows us to get customers who have already standardized on Ethernet," Gallup said, while network independence positions Domain for "other sites that may be on token-ring and, eventually, fiber cable." Domain will probably be ported to the Fiber Digital Data Interface standard, Gallup noted.

Apollo's 802.3 support is of major importance to Boeing Computer Services, according to Boeing manager of network technology Richard Wilk. "The Ethernet gateway works fine where you have the same type of device clustered together," he said. However, he added that in Boeing's commercial airplane division, "you have people working on Apollos, PCs, and other vendors' systems all in the same area.

"If everything ran on the vendors' proprietary networks," Wilk added, "we'd have to string four or five different wire types through the same area."

In order to achieve its goal of "everything running native on one type of wire" and on Ethernet, Boeing is encouraging all of its vendors to adhere to networking standards, Wilk said.

Domain users on a "moderately loaded Ethernet with 10 to 20 workstations" will experience a response-time degradation of approximately 20% compared with Apollo's proprietary token-ring, Gallup said.

Beginning in June, customers can order a Series 3000 Personal Workstation bundled with either the existing token-ring controller or the new 802.3 Network Controller-AT. A Series 3000 can support up to four controller cards. Additional 802.3 cards will be priced at $2,000. Such cards for other Domain workstations are said to be forthcoming.

Microsoft picks up pace, jumps ahead of Lotus

BY CLINTON WILDER
CW STAFF

Microsoft Corp., nearly doubling its revenue from year-earlier levels, surged past Lotus Development Corp. as the world's largest microcomputer software vendor in the quarter ended March 31.

Redmond, Wash.-based Microsoft had edged ahead of Lotus in revenue by $1.2 million two quarters ago, then slipped back to No. 2 by $854,000 in the last quarter of 1987. In the most recent quarter, Microsoft posted sales of $98.4 million, a 95% increase from $50.5 million a year earlier. Profits, restated to reflect changes in Microsoft's stock-option bonus plan, increased 109% to $22.2 million, or 79 cents per share.

Lotus posted a solid quarter, but its growth rates were dwarfed by its rival. The Cambridge, Mass.-based spreadsheet leader said sales rose 22% to $84.8 million and that profits gained 20%, increasing to $13.7 million, or 31 cents per share.

Both firms benefited from stronger than expected sales of personal computer hardware, as evidenced by results reported or expected from IBM, Apple Computer, Inc., Compaq Computer Corp. and Tandy Corp. But analysts pointed out that Microsoft is better positioned to ride the hardware wave. "Microsoft has high international exposure, and they have the operating system," said Bruce Johnston of First Boston Corp. "Sales of low-end PCs benefit them more than Lotus, which is selling primarily to business."

Goldman, Sachs & Co.'s Rick Sherlund said Microsoft's retail sales grew 115% in the quarter and that sales to OEMs increased 65%. "They blew us out of the water on the revenue, as usual," he said.

In mainframe software, Management Science America, Inc. (MSA) reported a $5.2 million, 29 cent per-share loss, mainly attributed to the costs of the Comserv Corp. acquisition. Revenue, however, increased 58% to $46.5 million. The first quarter is traditionally MSA's slowest, and the firm reported a loss of $410,000, or 2 cents per share, a year ago.

Other vendors reporting results last week included the following:

AT&T. A lowered bottom line helped AT&T post a 26% profit growth compared with year-earlier results that were restated because of an accounting change. But sales of telephone and computer equipment fell 8.5%. Revenue also declined, dropping 6.7% to $8.12 billion.

Tandem Computers, Inc. The Cupertino, Calif., maker of transaction processing systems continued its recent strength. Profits increased 81% to $22.4 million, or 46 cents per share, on sales that rose 37% to $242.3 million.

Contel nixes Comsat merger

BY JAMES A. MARTIN
CW STAFF

ATLANTA — Contel Corp. said last week that it wants to terminate its previously announced agreement to acquire Communications Satellite Corp. (Comsat) as a result of recent pending actions by the Federal Communications Commission against Comsat.

Two weeks ago, the FCC's Common Carrier Bureau tentatively ordered Comsat to refund $62 million to its customers after the agency determined that Comsat had earned more than its authorized after-tax profit margin between 1983 and 1986.

Comsat was designated in 1962 as the U.S. representative to the International Telecommunications Satellite Organization (Intelsat), a consortium of countries that provides international telecommunications service via satellite, and is thus subject to FCC regulation.

Other FCC actions pending against Washington, D.C-based Comsat have caused concern at Contel.

In its investigation, the FCC alleged that Comsat's rate structure was unfounded and ordered Comsat to lower its rates accordingly.

In a letter to the Securities and Exchange Commission, Contel also cited three other pending FCC actions against Comsat that would, if enacted, serve to erode Comsat's position in the satellite communications marketplace.

The merger, announced in September 1986, would have allowed Contel and Comsat to become one of the few companies that could challenge AT&T in supplying a wide range of telecommunications services.

In an unusual twist, the larger Contel was to become a subsidiary of Comsat, with Contel management taking over the merged corporations. The strategy was to maintain Comsat's name in international satellite communications.

U.S. vendors braced for tariffs

Companies plead for exemptions on products essential to their systems

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Reagan Administration last week said it would impose punitive tariffs on laptop, portable and desktop computer systems imported from Japan, in retaliation for alleged Japanese semiconductor chip dumping.

Companies likely to be affected are Toshiba America, Inc., a subsidiary of the Japanese firm Toshiba Ltd., and Data General Corp., whose DG/One is imported from Nippon-Data General Corp.

The Reagan Administration said it would not include minicomputers or mainframes in the tariff ruling, which imposes a 100% additional duty on affected imports.

A preliminary list had included 16- and 32-bit CPUs, disk drives, video display monitors, diskettes and computer tapes, but officials last week cut that list down.

U.S. officials had promised that the final list would not include items that are part of U.S. OEM or licensing deals and that it would include only those Japanese products for which there are alternate suppliers.

Amdahl, NAS lobby

Earlier in the week, Amdahl Corp., National Advanced Systems Corp., (NAS) and Honeywell Bull, Inc.—all of which rely heavily on Japanese suppliers—urged the administration to strike mainframes and disk drives from the tariff list. Otherwise, they said, severe damage to their businesses and layoffs would result.

The proposed tariff "is a bullet coming straight at the heart of the company," said John C. Lewis, president of Sunnyvale, Calif.-based Amdahl. He said Amdahl's contract with its disk drive supplier, Fujitsu Ltd., would force Amdahl to absorb the proposed 100% tariff at a cost of $100 million this year.

In Tokyo last Wednesday, the Electronic Industries Association of Japan (EIA-J) claimed that the 1986 U.S.-Japan chip pact will work if the U.S. government "gives us a chance," calling proposed trade duties dangerous and counterproductive.

Speaking to a committee of officials from the U.S. Departments of Commerce, Justice and State and the Office of the U.S. Trade Representatives, EIA-J spokesmen blamed the U.S. government for not giving last summer's pact time to work.

EIA-J submitted an updated report on Japan's semiconductor market to the U.S. officials. The report maintained that foreign chip makers' shares of the Japanese market are actually growing, while Japanese chip demand is falling.

The tariffs on $300 million worth of Japanese electronics products constitute the U.S. government's retaliation against Japan's alleged failure to live up to the U.S. Japan Semiconductor Agreement signed last year [CW April 6].

Commerce Secretary Malcolm Baldrige said the sanctions will remain in effect at least three or four months so that the U.S. can compile enough trade statistics to determine whether Japan is meeting its obligations under the semiconductor trade accord.

The U.S.-based Computer and Business Equipment Manufacturers Association (CBEMA) strongly opposed the preliminary list of targeted products because it contained items that U.S. computer vendors import and incorporate into their final products.

CBEMA asked the U.S. government to remove from the product list those components obtained by CBEMA companies from Japan and to exempt Japanese products manufactured under a U.S. license, contract or joint venture.

At a public hearing earlier in the week, vendors sought to have their Japanese-manufactured components knocked off the tariff list.

Honeywell Bull, based in Minneapolis, said the proposed tariff on 32-bit computers would jeopardize its DPS-90 mainframes which it obtains from its Japanese partner, NEC Corp.

NAS, which gets mainframes and disk drives from Hitachi Ltd. in Japan, would lose nearly half its business if those products were hit with tariffs, industry analysts said [CW, April 13].

Computer Consoles ups superminis

BY JAMES CONNOLLY
CW STAFF

IRVINE, Calif. — Computer Consoles, Inc. last week extended the technology of its top-end Power 6/32MP superminicomputer downward with the announcement of two Unix-based systems.

The Power 6/32EP and Power 6/32SP replace the Power 6/32E and original Power 6/32.

The new models were designed to be upgraded in the field to the Power 6/32MP, which reportedly provides customers with a growth path from the Power 6/32E, rated at 5 million instructions per second (MIPS), through the 8-MIPS Power 6/32SP to the 1-year-old, 14-MIPS Power 6/32MP.

The Power 6/32 and Power 6/32E that they replace were at the lower end of Computer Consoles computer-room systems family.

The Power 6/32EP and Power 6/32SP are scheduled to be available in May.

Prices reportedly start at $145,000.

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INSIDE LINES

Honorable intentions. Even during the week of U.S.-imposed trade sanctions against Japan, the fast pace of U.S.-Japan joint ventures continued. Computervision last week announced a major agreement with Japan's Toshiba, including the sale of 33% of Computervision's Japanese subsidiary to Toshiba. Toshiba will assemble and distribute Computervision's Caddstation family of computer-aided design platforms and work with Computervision to develop a Japanese version of the Caddstation's Unix operating system.

Secure knowledge. The Networker, Lotus's networking implementation for 1-2-3 and Symphony, is reportedly slated for release in the third week of June. The Networker missed its first-quarter ship date, and last month Lotus officials refused to commit to a second ship date. The product was delayed to correct bugs in two areas: the software that controls the number of counts (users) and file locking. There are about 45 copies of The Networker out in a beta-test version right now.

Share-a-Mac. The West Coast is buzzing with reports about a multiuser version of Apple's operating system, the Finder. According to one source, the multiuser Finder will be announced concurrently with the May delivery of the Mac II, which he says is on schedule. Also heating up the airwaves are continued reports that Apple will bring out token-ring cards for the new Macs, a subject Apple Chairman John Sculley reportedly alluded to during a presentation at a Businessland connectivity seminar in Chicago last week.

Basic wars, Round 2. Microsoft now says its Quick Basic Version 3.0 won't ship until April 30. The date gained new significance when Borland International also revved up to ship its new Turbo Basic, which it has positioned against Microsoft's upgraded product. The software duo is engaged in a features war surrounding their similar compilers, which are also similarly priced at just less than $100.

Lu-ee, Lu-ee, oh yeah. Me gotta go now. IBM's LU6.2 is heating up fast. We've talked to a half-dozen users recently, including a component of the U.S military that is considering LU6.2 as a replacement for its bisynchronous Remote Job Entry connections. But Mobil, which was considering the protocol as a potential connection between its IBM systems and DEC VAXs, was disappointed to learn that DEC's LU6.2 support currently lacks a corresponding PU2.1 component. This means that users have to go through an IBM host everytime they use LU6.2 to talk to the VAX. Since the whole idea of LU6.2 is to eliminate the mainframe middleman, Mobil has abandoned its LU6.2 plans — at least until DEC gets its PU2.1 act together, a spokesman said.

Cryptic signals. The regional Bell holding companies are currently evaluating the nature and extent of user demand for more secure local transmission through Bellcore, their research and development arm. Still at the exploratory stage, Bellcore's research may determine whether the holding companies begin offering security features such as encryption with various telecommunications services, or with information services that they would only be able to provide under the looser regulatory regime proposed by the Department of Justice.

Low-end lowdown. Tandem is believed to be on the verge of lowering the price of its entry-level EXT10 CPU by 9% in the wake of new low ends being announced this week (see story, page 10). The reduction, slated for late this month or early May, will reportedly coincide with Tandem's expected announcement of several packaged systems and some additional processor price cuts.

Here's a prospect. Sequent Computer Systems is planning a second-quarter rollout of a family of Intel 80386-based multiprocessors capable of 80 MIPS, according to a preliminary prospectus for an initial public stock offering to be made soon by Sequent. The prospectus claims the machines will be fully compatible with the installed base of Sequent's Balance line of parallel processing systems, which are based on the National Semiconductor 32032 microprocessor.

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